The Book of Choice Ferns

THE BOOK OF CHOICE FERNS.

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THE BOOK

OF

CHOICE FERNS

FOR

THE GARDEN, CONSERVATORY, AND STOVE.

DESCRIBING AND GIVING EXPLICIT CULTURAL DIRECTIONS FOR THE BEST AND MOST STRIKING FERNS AND SELAGINELLAS IN CULTIVATION.

ILLUSTRATED WITH

COLOURED PLATES AND NUMEROUS WOOD ENGRAVINGS,

SPECIALLY PREPARED FOR THIS WORK.

BY

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VOLUME III.

FROM OCHROPTERIS TO WOODWARDIA, AND SELAGINELLA.

LONDON:

L. UPCOTT GILL, BAZAAR BUILDINGS, DRURY LANE, W.C.

NEW YORK:

CHARLES SCRIBNER'S SONS, 153-157, FIFTH AVENUE.

LONDON:
L. UPCOTT GILL, LONDON AND COUNTY PRINTING WORKS,
BAZAAR BUILDINGS, W.C.

PREFACE TO VOL. III.

BY the publication of the Third Volume "The Book of Choice Ferns" is now completed, and it is hoped that, on account of the scientific yet practical lines upon which it has been written throughout, it will, as a whole, be duly appreciated by scientists as well as by amateur and professional gardeners. It will be noticed that the same care and attention which were conspicuous in its early stage have been bestowed upon it to its last pages, the Publisher having spared no expense to make it a work worthy of his production, while no pains have been spared by the Author to render it what may legitimately be considered a truthful Book of Reference and a work of popular interest.

All known species and varieties possessed of any decorative value have, at the hands of the Author, received special attention and have been described in full. Plants of more or less botanical interest, but useless from the decorator's point of view, though not fully described, have, nevertheless, been included in the enumeration, with remarks as to their habitats and dimensions, and references to previous works in which complete technical descriptions may be found. In so doing, the Author has been impelled by the desire of overcoming the great difficulty of "drawing the line" at any species or variety being by him considered a "Choice Fern."

To make researches both easy and useful, an exhaustive Index to the whole work has, at the suggestion of many Subscribers, been appended to this volume; and it is hoped by the Author, that, for practical purposes, he

has succeeded in the task which he had set himself of simplifying the nomenclature of known Ferns and Selaginellas. The correct names and the synonyms being given simultaneously and alphabetically, the cultivator may now ascertain without trouble whether the names he uses are right or wrong according to scientific classification; and he may implicitly depend on the cultural notes, which are the result of careful observations made during a period of upwards of twenty years of personal experience and practice.

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THE BOOK OF CHOICE FERNS.

VOL. III.

CHAPTER I.

OCHROPTERIS, *J. Smith.*

(O-chrop′-ter-is.)



N Hooker and Baker's "Synopsis Filicum" *Ochropteris* forms Genus 22, and occupies a position intermediate between *Adiantum* and *Lonchitis* in the tribe *Pterideæ*. The name is derived from *ochros*, pale, and *pteris*, a Fern, in reference to the colour of the plant. This genus is monotypic, that is to say, it comprises but one species: this is a beautiful and very rare Fern, having the general habit and texture of an ample-fronded and much-divided Davallia; its distinguishing character is seen in the disposition of the spore masses, and in the nature of their covering, formed of the margin of the frond and partaking of its texture. The plant requires an abundance of heat and moisture all the year round, and a compost of three parts peat, two parts sand, and one part loam. Like the majority of Ferns from the same habitat, it is averse to strong light. We are not aware that this interesting plant has ever been raised from spores either in this or in any other country in Europe.

O. pallens—pal′-lens (pale), *J. Smith.*

This handsome, stove Fern, native of Mauritius, is of medium dimensions only. Its elegantly-cut fronds, borne on naked stalks 2ft. long and of a peculiar pale straw-colour, are about 2ft. long, 1ft. broad, and quadripinnatifid (four times divided nearly to the midrib). The lower pinnules (leafits), 3in. to 4in. long and 2in. broad, have their segments cut down to the rachis (stalk of the leafy portion) below, with oblong, toothed lower lobes, the whole being of a leathery texture. The sori (spore masses), disposed at the extremity of the lobes of the segments, are covered by an involucre of the same shape, and formed of the reflexed margin of the frond, with which it coincides in texture. —*Hooker*, *Species Filicum*, ii., p. 54, t. 77B. *Nicholson*, *Dictionary of Gardening*, ii., p. 466.

ODONTOLOMA—Od-on-tol-o′-ma. *See* **Davallia.**

CHAPTER II.

OLEANDRA, *Cavanilles.*

(Ol-ĕ-an′-dra.)

THE meaning of the name *Oleandra* is obscure; but it is said to be derived from the Oleander (*Nerium Oleander*), which plant *O. neriiformis* is thought to resemble. In Hooker and Baker's "Synopsis Filicum" *Oleandra* forms Genus 46. It is a small, though extremely interesting division of the very extensive tribe *Aspidieæ*, and the species are almost restricted to the Tropics. Botanically, they are closely related to *Nephrodium*, from which they are principally distinguished by the peculiar scandent (climbing) habit of their wide-creeping rhizomes, by their jointed stalks, and by the entire (undivided) character of their fronds, which are more or less spear-shaped. The round and conspicuous sori (spore masses) are inserted in a row near the base, or below the centre, of the compact, free veinlets, and are covered by a reniform (kidney-shaped) involucre. Although Fée, in his "Genres de la Famille des Polypodiacées," enumerates no less than a dozen species, these have, by Hooker and Baker, been reduced to half that number.

Culture.

Although not an extensive genus, *Oleandra* embraces some of the most interesting trailing Ferns in cultivation. *O. neriiformis*, a plant much more like an Oleander than a Fern, is, however, an exception; it grows somewhat in the way of *Gleichenia flabellata*, but has thicker and more fleshy, erect

stems, which have, moreover, the peculiarity of branching out freely, and of being provided with aërial roots—a character to be found in scarcely any other cultivated Fern. All the other species make good specimens either trained upon stems of dead Tree Ferns, which they readily ascend and quickly cover, or grown on mounds of peat. None but very fibrous peat should, however, be used; thick turfs of it should be placed one above another, and tightly skewered together by means of wooden pegs so as to form a pyramid.

Another way of employing Oleandras is to use them for covering pillars indoors; but as they take possession of any genial surface, fastening themselves to it by means of short, fibry roots, it is indispensable that these should be provided with proper nourishment as the rhizomes extend. The best plan is to fix round the pillar a wire cylinder of 2in. to 3in. mesh, which should be filled up, as the rhizomes extend, with a mixture of two parts of fibrous peat and one of sphagnum, rammed tolerably close. For hiding pillars, walls, or unsightly upright supports, the Oleandras are quite as useful as the better-known Davallias, and do not require any more special attention; although not perhaps quite such rapid growers, they possess the advantage of retaining their foliage longer than is the case with most Davallias.

All the Oleandras known to cultivation require stove treatment and abundance of water at the roots throughout their growing season, and they are greatly benefited by occasional syringings overhead during the summer.

Although Oleandras may be propagated from spores, they are usually increased by division of the rhizomes—an operation which may safely take place any time between April and September.

Species and Principal Varieties.

O. articulata—ar-tic-ul-a′-ta (jointed), *Cavanilles.*

An evergreen species, native of Natal, the Mascarene Islands, the Seychelles, and the Guinea Coast; it is specially adapted for growing on small pyramids of peat. Its simple, entire (undivided) fronds are produced about 2in. apart, from firm, more or less upright, wide-climbing rhizomes (stems), from which they hang gracefully. They are borne on slender stalks 1in. to 2in. long, with the joint close to the base, and their leafy portion, 6in. to 12in. long, 1½in. to 2in. broad, and of a somewhat leathery nature,

has the midrib beneath slightly scaly. The sori (spore masses) in this species form two irregular rows of orange-brown dots, often some distance from the midrib. This is one of the smallest-habited plants of the genus, and looks well covering the stem of a dead Tree Fern. Its foliage is of a pleasing shade of light green, and the venation is exceedingly pretty.—*Hooker*, *Species Filicum*, iv., p. 156. *Nicholson*, *Dictionary of Gardening*, ii., p. 481.

O. a. Welwitschii—Wel-wit′-schĭ-i (Dr. Welwitsch's), *Baker.*

A native of Angola, having weaker and wide-trailing rhizomes clothed with rough scales like those of *O. nodosa.*—*Hooker*, *Synopsis Filicum*, p. 303.

O. chinensis—chi-nen′-sis (Chinese). Synonymous with *O. Cumingii.*

O. Cumingii—Cum-ing′-ĭ-i (Cuming's), *J. Smith.*

This singular species, native of Assam, Luzon, Burmah, &c., is easily distinguished from all others by its comparatively small rhizome (stem), which seldom exceeds the dimensions of an ordinary quill pen, and invariably trails horizontally. The peculiar conformation of the stalks on which the fronds are borne is another equally striking character: they form, about 2in. from the rhizome, a sort of joint, from which, when exhausted, the frond becomes detached, leaving the short lower portion of the stalks adhering firmly to the rhizomes, which are densely clothed with brownish and distinctly overlapping scales. The fronds, 1ft. to 1½ft. long, 1½in. broad, and of a soft, papery texture and dark green colour, are gradually narrowed towards both ends, and their midrib on both sides is slightly hairy. The rather large, light brown sori (spore masses) generally form a single and scarcely interrupted line near, but not close to, the midrib, although in some instances they may be found scattered irregularly a little distance from it. *O. chinensis* is identical with this species.—*Hooker*, *Species Filicum*, iv., p. 155.

O. C. longipes—long′-ip-ēs (having long feet or stalks), *Hooker.*

A native of Moulmein. The stalks of the fronds, which are of a length about equal to the leafy portion, are articulated near the middle instead of near the base. Fig. 1 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Synopsis Filicum*, p. 303. *Beddome*, *Ferns of British India*, t. 135.

O. C. Sibbaldi—Sib-bald′-i (Sibbald's), *Greville.*

A variety with thinner foliage, of a more hairy nature than in the species, and with sori (spore masses) disposed in very irregular lines not so near the midrib. This form, gathered in Tahiti by Sibbald and Bidwell, probably occurs also in Tropical Australia, as there are specimens of it amongst Leichhardt's plants.—*Hooker*, *Synopsis Filicum*, p. 303.

O. hirtella—hir-tel′-la (slightly hairy). A form of *O. neriiformis.*

O. Moritzii—Mor-itz′-ĭ-i (Moritz's). This is only a variety of *O. musæfolia.*



Fig. 1. Oleandra Cumingii longipes
(½ nat. size).

O. musæfolia — mu-sæ-fol′-ĭ-a (Musa-leaved), *Kunze.*

A very pretty and distinct, stove species, native of Ceylon and the Malayan Islands. It is a plant of dwarf, compact habit, and is best adapted for growing on mounds of peat. As in *O. articulata* and *O. Cumingii*, the stalks, ½in. to 1in. long, are jointed near the base, but the shoots are different in texture, being of a more woody nature than those of any other dwarf-growing kind, wide-climbing, and clothed with adpressed scales, curving upwards to where they bear their fronds, singly or in tufts of from two to five, and then downwards. The fronds, of a somewhat leathery texture, 6in. to 12in. long and 1in. to 1½in. broad, are gradually narrowed towards both ends, and naked or slightly hairy on their midrib. The very prominent sori (spore masses) are disposed in two irregular rows, one on each side of and near the midrib. The whole plant is of a fine, dark green colour.—*Hooker*, *Synopsis Filicum*, p. 302. *Nicholson*, *Dictionary of Gardening*, ii., p. 481.

O. m. Moritzii—Mor-itz′-ĭ-i (Moritz's), *Kunze.*

This variety differs from the species only through the rougher nature of the scales covering the shoots, and through the disposition of its fronds, which are more widely scattered.—*Hooker, Synopsis Filicum*, p. 302.

O. neriiformis—ne-rĭ-if-or′-mis (Nerium or Oleander-like), *Cavanilles.*

This, the most striking species of the genus, and which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1848, has a wide range of habitat. It is found in a wild state from New Granada and Guiana to Brazil and Peru, also in Fiji, New Guinea, Samoa, Aneiteum, Northern India, the Philippines, and the Malaccas, and on the Guinea Coast. Beddome, in his exhaustive work on "Ferns of British India," states that it is found on the Anamallays, on the Western slopes of the Neilgherries, in ravines in Ouchterlony's Valley, at an elevation of 5000ft., &c. Its mode of growth is peculiar, it being distinct in this respect, not only amongst Oleandras, but also amongst the whole family of Ferns. The rootstocks or shoots, which attain 4ft. in length and branch freely, are of a hard, woody nature, and as thick as one's little finger; they are jointed at irregular intervals and covered with brown, adpressed scales, which, in the older portions, are black and shining. A peculiarity

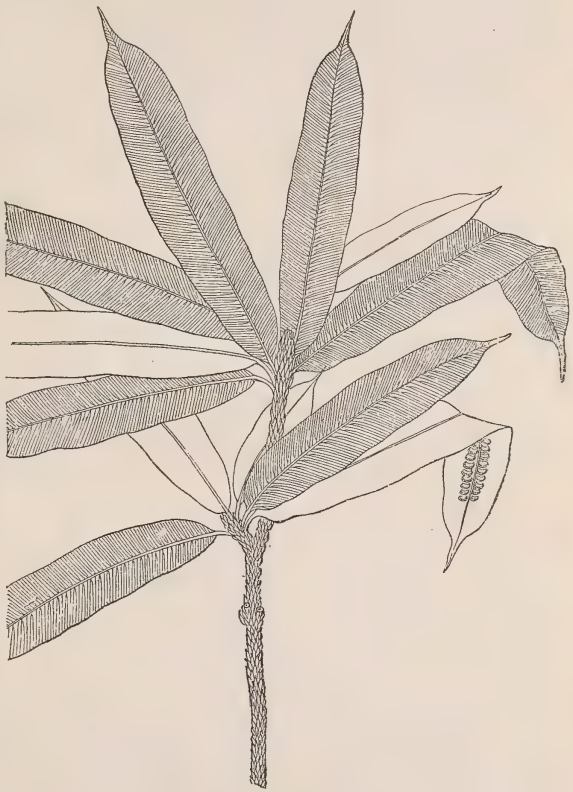


Fig. 2. Oleandra neriiformis (much reduced).

of these shoots is that they are generally found intertwined like a cluster of snakes: some are upright, while others lie more or less close to the ground, and throw out long, wiry roots in greater quantities than those of upright growth. The fronds are produced sometimes in opposite pairs, sometimes in whorls of three or four, at or near the summit of the terminal shoots, or sometimes from side branches, which are also very scaly (Fig. 2 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author). They are of a bright yellowish-green and of a somewhat leathery texture, 6in. to 18in. long, ¾in. to 1½in. broad, narrowed gradually towards both ends, slightly hairy on their under-surface, and smooth on the margin. The stalks on which these fronds are borne differ from those of nearly all other species, inasmuch as they seldom exceed 1in. in length, and are also jointed at their base, but the joint is generally hidden by the scales of the shoot which surround it. The very abundant sori (spore masses) are disposed in two rather irregular rows near the midrib.—*Hooker*, *Species Filicum*, iv., p. 156; *Filices Exoticæ*, t. 58. *Nicholson*, *Dictionary of Gardening*, ii., p. 481. *Beddome*, *Ferns of British India*, t. 264. *Lowe*, *Ferns British and Exotic*, vii., t. 16.

O. n. hirtella—hir-tel′-la (slightly hairy), *Miguel.*

This is probably the most distinct of the several varieties related to the above species. It is a South American plant, with fronds of thinner texture and of a more or less hairy nature, and with the sori (spore masses) often in an irregular, wavy line, and not close to the midrib, as in *O. articulata*.—*Hooker*, *Synopsis Filicum*, p. 302.

O. nodosa—no-do′-sa (knotty), *Presl.*

A beautiful, free-growing species, native of the West Indies and Guiana, where it has been found covering the stems of dead trees. It is readily distinguishable from all others by the trailing nature and satiny gloss of its shoots, and by the disposition of its fructification, which is irregularly scattered. The plant is of medium size, of a cheerful, bright green colour, and easily cultivated, especially when planted on partly-decayed vegetable matter. The venation of the fronds is particularly attractive and very conspicuous when seen from below, as they are of a semi-transparent, though somewhat leathery

texture ; they are 6in. to 12in. long, 1½in. to 2½in. broad, slightly wavy, and pointed at their summit. The stalks, 2in. to 6in. long and often blackish, are jointed not far from the base. The abundant and conspicuous sori (spore masses) are scattered, but placed nearly all in the inner half of the frond.—*Hooker*, *Species Filicum*, iv., p. 157. *Nicholson*, *Dictionary of Gardening*, ii., p. 481. *Lowe*, *Ferns British and Exotic*, vii., t. 17.

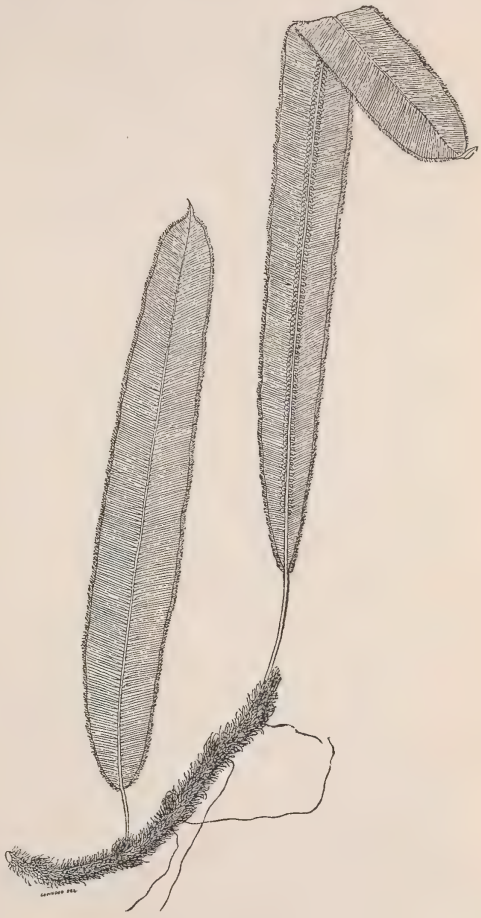


Fig. 3. Oleandra Wallichii
(½ nat. size).

O. Sibbaldi—Sib-bald′-i (Sibbald's). A variety of *O. Cumingii.*

O. Wallichii—Wal-lich′-ĭ-i (Wallich's), *Hooker.*

According to Beddome, this thoroughly distinct and somewhat scarce species is indigenous in Northern India, from Simla and Kumaon in the West to Bhotan in the East, also in Assam and Khasya, where it is reported at 7000ft. elevation. Although of the same habit as the other species, it differs in general aspect from all of them. Its most distinctive character resides in the margins of its fronds, which are furnished with numerous short hairs along all their length (Fig. 3 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author). These fronds, 6in. to 12in. long and ¾in. to 1½in. broad, are abundantly produced from branched, horizontally-trailing shoots, which are densely clothed with spreading scales of a rusty-brown colour. They are usually of a dull green colour, disposed about 2in. apart, and

borne on short stalks jointed close to the base, so that their very short articulation is concealed among the scales. The sori (spore masses) are disposed in a continuous line or chain close to and parallel with the midrib.—*Hooker*, *Species Filicum*, iv., p. 158. *Nicholson*, *Dictionary of Gardening*, ii., p. 481. *Beddome*, *Ferns of British India*, t. 265.

O. Welwitschii — Wel-wit′-schĭ-i (Dr. Welwitsch's). This is a variety of *O. articulata.*

OLFERSIA—Ol-fer′-sĭ-a. *See* **Acrostichum.**

CHAPTER III.

ONOCLEA, *Mettenius.*

(On-oc′-lĕ-a.)

Sensitive and Ostrich-feather Ferns.



HIS genus, which comprises only three species of Ferns inhabiting cold and temperate regions, derives its name from *onos*, a vessel, and *kleio*, to close, in allusion to the singularly rolled-up character of the fructification. It is a small subdivision of the tribe *Dicksonieæ*, and forms, in Hooker and Baker's "Synopsis Filicum," Genus 9. The distinctive characters of *Onoclea* are so striking that the plants cannot possibly be mistaken. The principal of these characters is the disposition of the sori (spore masses), which form a fertile frond entirely differing from the barren ones in texture as well as in general appearance. They are globose, situated on the veins of the changed or contracted leaflets, with the revolute (turned-back) margin of which they are quite concealed. Sometimes the sori are covered with a very thin, delicate, half-cup-shaped involucre, originating from the under-side of the sorus; in many instances, however, this covering is wanting. In one of the three species, *O. sensibilis*, the stems are of an underground-creeping nature; whereas in the others the stem, or caudex, occupies an upright position. In all cases the fronds are stipitate (borne on stipes or stalks), pinnate (once divided to the midrib) or pinnatifid (divided half-way to the midrib), and their veins are either free or intercross one another.

Onoclea and *Struthiopteris* have been united by Mettenius, the plants, of a hardy nature, being natives of North America, Sikkim, Japan, and

Eastern Europe. Though the genus has no British representative, yet the most beautiful species, *Onoclea* (or, as it is usually called, *Struthiopteris*) *germanica*, is stated by Correvon, in his "Fougères rustiques" (p. 65), to belong to the flora of Eastern and Central Europe, being found in Germany, Austria, Scandinavia, Finland, Denmark, and Russia, as well as in Asia Minor, Siberia, and as far as Kamtschatka.

Culture.

These plants require an abundance of water at the roots all the year round, and are best adapted for planting out in the hardy rockery or Fernery, as pots scarcely afford them sufficient accommodation for the full development of their rhizomes or stolons, which, in some instances, extend a very long distance. In the case of *Onoclea germanica* of Hooker, with which *Onoclea Struthiopteris* of Hoffmann and *Struthiopteris germanica* of Willdenow are identical, the plant is provided with stolons, which are said by Sachs to originate from buds formed on the stalks near the base. These organs run underground for several inches or a foot, then rise to the surface and there thicken into a short, upright stem covered by overlapping stalk-bases, and throw up from their summit a grand vase-like circle of foliage composed of two distinct sorts of fronds—the barren ones, which are numerous and produced early in the spring, and the fertile ones, which are few in number and produced late in the summer. The fertile fronds are contracted, much shorter than the others, and very rigid.

The soil which Onocleas prefer is a compost of three parts of good strong loam and one of leaf-mould. Great care should be taken that at all times of the year their roots should be kept in a damp state. Some magnificently cultivated examples of these Ferns exist at the Botanic Gardens, Cambridge, where Mr. R. I. Lynch has had the good idea of planting them close to the edge of a pond, with the result that *O. sensibilis* rivals in size and majesty the Royal Fern (*Osmunda regalis*) itself.

Onocleas may be increased by means of spores, but their propagation is effected usually by division of their underground rhizomes, or of their stolons, an operation which, as the plants are of a deciduous nature, is best performed when they are at rest, from October to March.

Species and Variety.

O. germanica—ger-ma′-nic-a (German), *Hooker*.

This beautiful species, usually found in gardens under the name of *Struthiopteris germanica*, is the strongest-growing species known. Eaton, in his splendid work, "Ferns of North America," says: "The Ostrich Fern is one of our finest Ferns, being surpassed in grandeur only by *Acrostichum aureum*, *Woodwardia radicans*, and perhaps *Osmunda regalis*. Its grand, vase-like circle of foliage is often higher than a man's head, and sometimes extends above his utmost reach." We have never seen it attain such dimensions in this country, its broadly-spear-shaped fronds seldom reaching more than 4ft. in length under culture. The places where this Fern attains the dimensions stated by Eaton are in low grounds, especially in fine alluvial soil, subject to the overflow of rivers, from the Saskatchewan and Lake Winnipeg to New Brunswick, and southward to Pennsylvania and Illinois. There, it is stated, the barren fronds attain 10ft. in length. Under cultivation these are much shorter, narrowed from the middle to the base, and abruptly terminate in a point at their summit; they are furnished with numerous stalkless leaflets, the lowest being wavy and thrown back, and many of them pinnatifid (again divided half-way to the midrib). The leaflets are of a light green colour and of a soft, papery texture, and they are frequently injured by late spring and early autumn frosts. The fertile fronds, produced only in autumn or late in the summer, are disposed in the middle of the crown and perfectly erect; they are much shorter than the barren ones, and much contracted. The lobes of the leaflets have their margins much recurved, so that the whole leaflet forms a somewhat articulated, pod-like body. The sori (spore masses) are covered by a delicate, cup-shaped involucre of a very fugacious nature. — *Hooker*, *Species Filicum*, iv., p. 161. *Nicholson*, *Dictionary of Gardening*, ii., p. 497. *Eaton*, *Ferns of North America*, ii., t. 73.

O. orientalis—or-ĭ-en-ta′-lis (Eastern), *Hooker*.

This, the *Struthiopteris pennsylvanica* of Willdenow, is by some authors considered as simply a form of *O. germanica*, which it greatly resembles, though its fronds are not attenuated at the base, the lower leaflets being as long

as those of the middle of the barren frond. It is a native of Pennsylvania, Hakodadi, Japan, and Assam, and is reported as found in Sikkim at 12,000ft. elevation. As showing differences between this species and *O. germanica*, Correvon states ("Les Fougères rustiques," p. 65) that the pinnules (leafits) are much longer, and have also an oblong-spear-shape quite different; that in the "Jardin Alpin," where it has been grown for five years under similar conditions, it is much more vigorous than *O. germanica*, which, there, is preserved alive only with great difficulty; that the colour of its foliage is much darker, and that the production of its fertile fronds is more backward than in that species.—*Hooker*, *Second Century of Ferns*, t. 4; *Species Filicum*, iv., p. 161. *Nicholson*, *Dictionary of Gardening*, ii., p. 497. *Correvon*, *Les Fougères rustiques*, p. 65.

O. sensibilis—sen-sib′-il-is (sensitive), *Linnæus.*

This beautiful Fern is undoubtedly one of the oldest, if not even the very oldest, of exotic Ferns introduced to Europe, for, according to Lowe, it was imported in 1699 from North America. Eaton says it is to this day found growing wild in wet meadows and thickets from New Brunswick to Saskatchewan, extending southward through Dacotah, Kansas, and Arkansas to Louisiana, and eastward to St. Augustine, Florida; and that it is in fact one of the commonest Ferns of North America, often occupying large patches of land, to the partial exclusion of other plants. Though this highly interesting Fern is not found in Western America or in Europe, oddly enough, it frequently occurs in Japan and Siberia. Its main attraction lies in the pleasing, soft, pale green colour of the lovely barren fronds, broadly triangular in outline, long-stalked, and cut down nearly to the midrib into oblong-spear-shaped leaflets, which are wavy or slightly toothed at the margins (Fig. 4). The middle of the frond is winged from the basal or from the second pair of leaflets, the wing at the base being very narrow, but gradually widening



Fig. 4. Onoclea sensibilis, showing Habit and Portions of Fertile Frond and Barren Leaflet.

(Habit, much reduced; Portions, ½ nat. size

towards the summit. These barren fronds sometimes reach 1½ft. in length, especially when the plants are well established in a naturally and constantly moist part of the rockery, and, as they are borne on stalks of about the same length, they attain about 3ft. in height, a result never attained under pot-culture. The texture is herbaceous (soft and papery), the surfaces are perfectly smooth, and the under-side is slightly bluish. The fronds do not last long when cut, even when put in water, but shrivel almost immediately, showing a disposition to fold their leaflets face to face, for which reason, Eaton says, the plant has received the popular name of "Sensitive Fern." The foliage of this Fern is also very sensitive to a cold temperature, for the first autumn frosts always destroy it, and the late spring frosts which we sometimes experience in May and June have the same injurious effects. These remarks apply to barren fronds only, which are by far the handsomer and the more numerous. Fertile fronds are not very common, and are so unlike the barren ones that no one unacquainted with the plant would suppose them to be related to each other. Both kinds are produced from a thick, fleshy rhizome which runs underground; the fertile ones stand about half the height of the barren ones, and are perfectly rigid and nearly black when fully developed. Another peculiarity is that they dry up in winter, but remain erect during the following summer, so that a fruiting plant often bears fertile fronds of two years' growth. The involucre with which the sori (spore masses) are covered is globose, and bursts at the summit.—*Hooker*, *Species Filicum*, iv., p. 160. *Nicholson*, *Dictionary of Gardening*, ii., p. 497. *Lowe*, *Ferns British and Exotic*, vi., t. 1. *Eaton*, *Ferns of North America*, ii., t. 72.

O. s. obtusilobata—ob-tu-sil-ob-a′-ta (having blunt lobes), *Schkuhr*.

A rare, abnormal form, in which the leaflets of some of the barren fronds become again pinnatifid and more or less contracted, but when grown side by side with the species this variety frequently resumes its normal characters.—*Nicholson*, *Dictionary of Gardening*, ii., p. 497. *Lowe*, *Ferns British and Exotic*, vi., p. 7. *Eaton*, *Ferns of North America*, ii., p. 199.

CHAPTER IV.

ONYCHIUM, *Kaulfuss.*

(On-ych′-ĭ-um.)

THE name of this genus of very beautiful Ferns, from Arabia, India, Cuba, Japan, &c., is derived from *onyx*, *onychos*, a claw, in reference to the shape of the lobes of the fronds. In Hooker and Baker's "Synopsis Filicum" these plants form Genus 27, being a small but very interesting division of the tribe *Pterideæ*. These Ferns, in fact, differ from *Pteris*, with which they are united by Mettenius, much more in the cutting of their fronds, and the smallness and narrowness of their ultimate segments, than in their fructification. The sori (spore masses) are placed upon a continuous, linear (very narrow) receptacle, which connects the summits of several veins; they are covered with a long and narrow involucre, which is disposed parallel with the margin of the segments, pressed down over the spore masses, and with its edge nearly or quite reaching the midrib. The genus has no British representative.

Culture.

Although four species belonging to this genus are known in cultivation, the two most extensively grown—*O. auratum* and *O. japonicum*—are extremely elegant, and possess some useful decorative qualities. Their fronds are so light and finely cut, and of such a pleasing colour, that they are specially adapted for mixing with cut flowers, amongst which they look as graceful as

some of the finest Adiantums, and remain fresh much longer. Their habits are totally distinct, a character which cannot possibly be attributed to their different habitats. While *O. auratum* produces its ample and handsomely decompound fronds from a single crown, thus forming a sort of miniature *Pteris tremula* with finely-divided foliage, *O. japonicum*, on the contrary, produces them from numerous underground rhizomes (prostrate stems), making thick tufts of graceful and pleasing foliage, green on both sides ; whereas that of the former species, when in a fertile state, is of a beautiful golden colour beneath, which gives the plant quite the appearance of a golden Fern. The colouring, however, is due, not, as in Gymnogrammes and Nothochlænas, to the presence of powder, but to the indusia, which are of a bright, rich golden hue. It is not in habit only that these two most interesting species differ, for the treatment which they require is also dissimilar. While *O. japonicum* thrives well in a cool house—in fact, will not stand stove treatment, under which it is soon attacked by thrips—*O. auratum* requires a stove, or at least a good intermediate house, all the year round. The same compost suits them both, viz., a mixture of fibrous loam, peat or leaf mould, and silver sand, in about equal proportions. Both should be potted loosely, as they have great aversion to hard soil at any time. Care must also be taken to ensure their fronds being kept dry at all seasons, as if allowed to get wet they soon turn to a darkish brown colour and begin to decay.

O. japonicum is easily propagated from spores, which germinate freely, or by division ; but the same cannot be said of *O. auratum*, which no doubt would be equally popular if its propagation were more rapid ; the fact of its forming only single crowns prevents its increase by division. The only mode of dealing effectually with this handsome species is, therefore, by means of seedlings, which come up freely enough, but which have a natural tendency to damp off just above ground while in a young state.

Species.

O. auratum—aur-a′-tum (golden), *Kaulfuss.*

This lovely, evergreen, stove species is a native of the Malayan Peninsula and Islands ; it is also found on the Himalayas up to 5000ft. elevation, on the Neilgherries, and on the Paulghaut Mountains. The barren and the

fertile fronds are of similar dimensions, but otherwise different. Both kinds are borne on stout, erect, naked stalks, 6in. to 12in. long, of a pale brown colour. The barren ones, 1ft. or more in length and 8in. to 12in. broad, are quadripinnatifid (four times divided half-way to the midrib); their lower leaflets, somewhat triangular and spreading, are 4in. to 6in. long and furnished with numerous pinnules (leafits) and segments of a somewhat triangular shape; their ultimate divisions are often wedge-shaped and trifid at the summit. The fertile fronds are readily distinguished at first sight by their less divided nature, and by the pod-like appearance of their leafits (see Fig. 5, reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author), which are seldom more than ½in. to 1in. long and ⅛in. broad. The upper surface of both kinds of fronds is of a beautiful, bright, glossy green, while the under-surface of the fertile ones is rendered very attractive by the rich golden colour of its sori (spore masses), which are covered with an involucre of parchment-like texture.—*Hooker*, *Species Filicum*, ii., p. 121. *Hooker and Greville*, *Icones Plantarum*, t. 121. *Nicholson*, *Dictionary of Gardening*, ii., p. 499. *Beddome*, *Ferns of Southern India*, t. 30. *Lowe*, *New and Rare Ferns*, t. 1.



Fig. 5. Fertile Frond of Onychium auratum
(½ nat. size).

In potting or planting this species, the utmost care should be taken to keep the crown well above the surface of the soil, which must be thoroughly drained.

O. capense—ca-pen′-se (from the Cape). This is a garden synonym of *O. japonicum*.

O. japonicum—jap-on′-ic-um (Japanese), *Kunze*.

This greenhouse species—by far the best known, though perhaps not the handsomest—is undoubtedly the most useful of those in cultivation, being

freer in growth and producing its fronds in greater abundance than any other (Fig. 6). These, however, are of a semi-deciduous character, 1ft. or more in length, 6in. broad, egg-shaped, and quadripinnatifid (four times divided halfway to the midrib). The lower leaflets of the barren ones are 4in. to 6in. long, broadly-spear-shaped, and furnished with numerous, usually triangular, pinnules (leafits) and segments. Contrary to those of *O. auratum*, the segments in this species, both fertile and barren, are uniform, being all narrow-linear, a little tapering below, and gradually sharp-pointed. The fronds are produced from a short-creeping rhizome (prostrate stem), and borne on slender, erect, naked, straw-coloured or pale brown stalks 6in. to 12in. long; they are of a somewhat leathery texture and of a bright, shining green colour on both sides—hence the common garden name of *lucidum*. This useful species is a native of Japan, China, and Northern India (ascending in Sikkim to 10,000ft. elevation), and Hooker states that the plant common in Japan does not differ from the ordinary Himalayan form. The sori (spore masses), of a bright brown colour, are covered with a pale involucre of a parchment-like texture, and occupy nearly the whole under-surface of the segments. According to the authors of the "Synopsis Filicum," "*O. capense*, Kunze, seems to be this, reported from South Africa by mistake."—*Hooker*, *Synopsis Filicum*, p. 144; *Species Filicum*, ii., p. 122. *Nicholson*, *Dictionary of Gardening*, ii., p. 499.



Fig. 6. Onychium japonicum
(¼ nat. size).

O. lucidum—lu′-cid-um (shining). A garden name for *O. japonicum*.

O. melanolepis—mel-an-ol′-ep-is (having black scales), *Decaisne.*

A greenhouse species, of small dimensions, native of Persia, Arabia, and Abyssinia. Its egg-shaped fronds, 3in. to 4in. long, 2in. broad, and borne on slender, naked, straw-coloured stalks 4in. to 6in. long, are quadripinnatifid (four times divided half-way to the midrib). The lower leaflets are 1in. to 1½in. long, deltoid (in shape of the Greek delta, Δ), and furnished with pinnules (leafits) of similar shape and somewhat distantly placed. The whole frond is of a thin, papery texture and smooth on both surfaces ; and the sori (spore masses), of a light brown colour, are covered with a pale involucre of parchment-like texture. — *Hooker*, *Species Filicum*, ii., p. 124 ; *Icones Plantarum*, t. 902.

O. strictum—stric′-tum (upright), *Kunze.*

This stove species, native of Cuba, bears on slender, tufted, naked, straw-coloured stalks 6in. to 12in. long and of a polished nature, fronds 6in. to 9in. long, 3in. to 4in. broad, and quadripinnatifid (four times divided half-way to the midrib). The leaflets are deltoid (in shape of the Greek delta, Δ), with a few distant segments, which are very narrow and sharp-pointed, either entire or once or twice cleft at the apex or again slightly branched. The ultimate divisions are also sharp-pointed and very narrow. The texture is soft and papery, the stalks and both surfaces are naked, and the fertile segments are larger than the others. The involucre which covers the sori (spore masses) is often considerably shorter than the segments on which they are placed ; it is of a pale colour and of a parchment-like texture.—*Hooker*, *Species Filicum*, ii., p. 123 ; *Second Century of Ferns*, t. 32.

OPHIODERMA—Oph-ĭ-od-er′-ma. *See* **Ophioglossum.**

CHAPTER V.

OPHIOGLOSSUM, *Linnæus.*

(Oph-ĭ-og-lōs′-sum.)

Adder's-tongue Ferns.



HESE Ferns, with *Botrychium* and *Helminthostachys*, represent the whole of the sub-order *Ophioglossaceæ*, in which the plants are distinguished by their deeply two-valved capsules opening down the side nearly to the base, and being without a ring. The name is derived from *ophios*, a serpent, and *glōssa*, a tongue; in allusion to the arrangement of the fructification (which is composed of stalkless capsules arranged in two rows so as to form a narrow, close spike). *Ophioglossum* forms in Hooker and Baker's "Synopsis Filicum" Genus 73. Though it comprises but a comparatively small number of species, it is, botanically, divided into four sub-genera, as follow:

Cheiroglossa (Cheir-og-lōs′-sa), *Presl.* In this sub-genus the fertile spikes are numerous, and arise from the base of the barren segment.

Euophioglossum (Eu-oph-ĭ-og-lōs′-sum), *Linnæus.* The plants belonging to this sub-genus are furnished with single fertile spikes, arising from the base of the barren segment.

Ophioderma (Oph-ĭ-od-er′-ma), *Endlicher.* The fertile spikes, which are usually single, arise, in this sub-genus, from the centre of the barren segment.

Rhizoglossum (Rhi-zog-lōs′-sum), *Presl.* In this sub-genus the fertile and barren fronds are distinct.

The genus is represented in England only by the common Adder's-tongue, *O. vulgatum.*

Culture.

This interesting, though unpretentious, genus consists of plants of most extraordinary forms and of appearance unlike that of any other known Ferns. The Botrychiums most closely resemble them, and they are also found in somewhat similar situations, that is, growing amongst moss and grass in moist meadows. Although none of the Ophioglossums are what may be termed very ornamental, yet several of them should be grown, as they deservedly are in some of our best collections, as great curiosities. The members of this genus are widely scattered all over the globe, yet, with the exception of *O. pendulum*, which is found throughout the Tropics of the Eastern Hemisphere, and consequently requires warm treatment, all the other known species are distributed over Europe, America, and Africa, and require but little artificial heat. America, indeed, is particularly prolific in Ophioglossums, the majority of which come from Florida, Louisiana, Peru, and Brazil.

Ophioglossums are useless as pot plants, and succeed best when planted out in the Fernery, where a naturally damp spot should be prepared for them. The compost should consist of fibrous loam and half-decayed sphagnum, in about equal proportions, with an admixture of sand, in which their fleshy roots plunge with avidity. Ophioglossums are not aquatic plants ; therefore, although requiring a constantly moist situation, they must not on any account be planted where there is any stagnant water.

Propagation is usually effected by division. We are not aware that any seedlings have ever been raised artificially.

Principal Species and Varieties.

O. (Rhizoglossum) Bergianum — Rhi-zog-lōs′-sum ; Berg-ĭ-a′-num (Berg's), *Schlechtendahl.*

This very delicate and distinct little, greenhouse species, the only one known at present belonging to this section, with barren and fertile fronds distinct, is a native of Cape Colony, where it is said to be rare. The barren fronds are ½in. to 1in. long, ½in. broad, and of a fleshy nature. The fertile

ones, which are borne on a slender stalk 1in. to 1½in. long, consist of a slender spike ¼in. long. Both are produced from a slightly tuberous rhizome (prostrate stem).—*Hooker*, *Icones Plantarum*, t. 263.

O. bulbosum—bul-bo′-sum (bulbous), *Michaux*.

A half-hardy species, also known as *O. opacum* of R. Brown and *O. tuberosum* of Hooker and Arnott. It is one of the smallest of the North American species, and is found growing in old fields and low, sandy grounds, from South Carolina and Florida to Louisiana; it has also been found in Chili. From four to six of its curiously-shaped fronds are produced during one season from a solid, tuberous rootstock, nearly ½in. thick and furnished with only a few fleshy, descending roots. These fronds, 2in. to 4in. long including the stalk, have their fertile portion placed considerably below the middle. This fertile spike, about ¼in. long, is borne on a stalk 1½in. to 2in. long when fully developed. The texture of the barren portion is stouter than in *O. vulgatum*, which this species somewhat resembles in general appearance. After the spores have been discharged, the spike is said, by Walter, to bear some resemblance in miniature to the rattle of a rattlesnake.—*Hooker and Greville*, *Icones Filicum*, t. 50. *Nicholson*, *Dictionary of Gardening*, ii., p. 499. *Eaton*, *Ferns of North America*, ii., t. 81.

O. (Ophioderma) intermedium — Oph-ĭ-od-er′-ma; in-ter-med′-ĭ-um (intermediate), *Hooker*.

This stove species, native of Borneo, and by some authorities considered as a mere form of *O. pendulum*, has fronds erect, 6in. to 8in. long, their flattened stem gradually passing into the leafy part, which is ½in. broad not far from the point. They are of a fleshy texture, and the fertile spike, 1½in. long and erect, is borne on a stalk which about equals it in length and just reaches to the point of the barren segment.—*Hooker*, *Icones Plantarum*, t. 995.

O. lusitanicum—lu-sit-a′-nic-um (Portuguese), *Linnæus*.

A half-hardy species, of medium dimensions, native of Portugal, Spain, Italy, France, Madeira, Teneriffe, and the Azores; it is also found on the shores of the Mediterranean, and as far north as Guernsey, where it was

discovered in 1854, growing in sandy loam, near Petit Pot Bay, and it has since been noticed in other parts of that island. Its fronds, produced from a slightly tuberous rootstock, are 1in. to 3in. long, narrow-spear-shaped, with the point bluntish and the base narrowed; they are of a thick texture and do not show any midrib. The fertile spike, about ½in. long, is borne upon a firm stalk ½in. to 1½in. long when fully developed.—*Hooker*, *British Ferns*, t. 47. *Nicholson*, *Dictionary of Gardening*, ii., p. 500. *Lowe*, *Ferns British and Exotic*, vii., t. 65B. *Correvon*, *Les Fougères rustiques*, p. 163.

This species requires greenhouse protection in winter if cultivated in pots, and should then be potted firmly and particularly well drained.

O. minor—min′-or (lesser). This is probably the same as *O. vulgatum ambiguum*.

O. nudicaule—nu-dic-au′-lĕ (naked-stemmed), *Linnæus*.

This half-hardy, North American species, probably one of the smallest kinds known, seldom exceeds 4in. in height. It is found growing plentifully on sandy borders of ponds in South Carolina, Georgia, Alabama, and Florida; it is also found in New Caledonia, in the Malaccas, on the Guinea Coast, in Angola, &c. Its fronds, produced from four to six in one crown from a slightly tuberous rootstock, are of a bright, pale green colour. The barren division, ½in. to 1½in. long, about ½in. broad, and egg-shaped or oblong, is of a thin texture and does not show any veins. The fertile spike, ½in. long, is borne on a stalk often 2in. to 3in. long and of a very slender nature.—*Hooker*, *Synopsis Filicum*, p. 445. *Eaton*, *Ferns of North America*, ii., t. 81. *Beddome*, *Ferns of Southern India*, t. 71.

O. opacum—o-pa′-cum (opaque). This is synonymous with *O. bulbosum*.

O. (Cheiroglossa) palmatum—Cheir-og-lōs′-sa; pal-ma′-tum (palmate, hand-like), *Linnæus*.

Of all the North American species this is the most interesting and the most showy; it also differs from all other kinds from the same country in being thoroughly epiphytal. It is found growing wild in the axils of the old leaves of the Palmetto, on the banks of the Caloosahatchie, South Florida, Forks of Turkey Creek, Indian River, Florida, always nestling in the sheaths of the old leaves of the Palmetto. It is also a native of Southern Brazil

and Mexico, where, according to Tweedie, "it only grows in the axils of old leaves of a species of Palm," and more rarely on moist schistose rocks. *O. palmatum* is of more robust habit than most other species, and has a totally different appearance, the great weight of its generally hand-shaped fronds giving them a gracefully-pendent habit. These fronds are produced in a cluster at the summit of a rootstock about the size of a hazel-nut and profusely provided with roots along its sides. The number of fronds on one rootstock is said by Garber to be sometimes more than a dozen, but usually there are from three to six only. They are of a light green colour and of a somewhat fleshy nature, and are borne on round, fleshy, flaccid stalks 6in. to 12in. long. Besides being hand-shaped, their leafy portion, 6in. to 12in. long and 4in. to 8in. broad, is wedge-shaped at the base, and, unlike all others, more or less cut from the circumference towards the centre, generally being deeply divided into a variable number of tongue-shaped segments. The fructification is most singular: it is produced in small spikes, forming miniature catkins about 2in. long, borne on peduncles (stalks) a little shorter than themselves. These catkins are disposed from two to twelve on the incurved edges of the frond, where it begins to widen from the common stalk, sometimes on the stalk itself, and rarely on the upper surface of the frond. Occasionally a fertile spike or its peduncle is forked. These spikes are manifestly appendages of the frond, as Hofmeister considers the spike of *O. vulgatum* to be, and not special fronds partly consolidated with the barren lamina (blade). This singular species should be grown suspended in a cool house.—*Hooker*, *Synopsis Filicum*, p. 446. *Nicholson*, *Dictionary of Gardening*, ii., p. 500. *Eaton*, *Ferns of North America*, ii., t. 81.

O. (Ophioderma) pendulum—Oph-ĭ-od-er′-ma; pen′-dul-um (drooping), *Linnæus.*

A thoroughly epiphytal, stove species, native of Polynesia, Ceylon, the Philippines, and the Mascarene Islands, where it is found growing plentifully on branches of trees, its curious barren fronds hanging gracefully down to an almost indefinite length. These fronds are ribbon-like, without a distinct stalk, and are said to measure sometimes 15ft. in length; they are 1in. to 3in. broad, simple or forked, and of a fleshy texture. The fertile spike is usually solitary, rises from the middle of the lamina (blade), not far

from the base, and is borne on a stalk shorter than itself; it is much heavier than in any other species, and often 6in. long. As an example of the extreme variability of this singular Fern, according to the habitat in which it is found, it may be noted that while it is reported as decorating the forest trees on which it grows, in Madagascar, with green ribbons some 12ft. long, in Ceylon its fronds seldom exceed 6ft. in length. Although it has been repeatedly imported by various firms, this curious plant is even now found only in a very few collections. In its natural state it is frequently seen growing along with *Platycerium grande*, a Fern to which it bears a certain resemblance, so far as the drooping part of the latter plant is concerned. Its roots, which, like those of Platyceriums, are of a fleshy nature, are deeply embedded in a spongy mass of moss and roots. Fig. 7 is reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author.—*Hooker and Greville, Icones Filicum*, t. 19. *Nicholson, Dictionary of Gardening*, ii., p. 500. *Eaton, Ferns of North America*, ii., t. 81.



Fig. 7. Ophioglossum pendulum (much reduced).

To cultivate this species with anything like success it requires to be either suspended in a basket or fixed on a piece of board in a warm house, with about equal parts of spongy peat and sphagnum moss.

O. reticulatum—re-tic-ul-a′-tum (netted), *Linnæus.*

This stove species, which is readily distinguished by the non-tuberous character of its rootstock, has a wide range of habitat, being found in

Tropical America, from Cuba to Peru and South Brazil; in Polynesia, the Malayan and the Philippine Islands; in the East Indies as far north as the Himalayas, on the Guinea Coast, in Zambesi Land, in Cape Colony, &c. Its fronds, 6in. to 12in. long, of a thin texture, with distinct veins and usually no midrib, have their barren division placed near the middle; this portion, which shows distinctly heart-shaped lobes at its base, is blunt or nearly so at its summit, and measures 2in. to 3in. in length and 1½in. to 2in. in breadth. The fertile spike, 1in. or more in length and borne on a slender peduncle 2in. to 4in. long, much overtops the barren portion of the frond.—*Hooker and Greville*, *Icones Filicum*, t. 20. *Nicholson*, *Dictionary of Gardening*, ii., p. 500. *Beddome*, *Ferns of Southern India*, t. 70.



Fig. 8. Ophioglossum vulgatum, showing Creeping Rhizome and Barren and Fertile Fronds
(½ nat. size).

O. tuberosum — tu-ber-o′-sum (tuberous). Synonymous with *O. bulbosum*.

O. vulgatum — vul-ga′-tum (common), *Linnæus*.

This, the common Adder's-tongue (Fig. 8), has a most extensive habitat, for while it is a well-known British Fern, it also occurs from Lapland to Japan and the Himalayas; in the Azores, on the Guinea Coast, in St. Helena, Cape Colony, Australia, New Zealand, Temperate North America, &c. Eaton, in "Ferns of North America," says, "The common Adder's-tongue is commonest in low meadows, but sometimes found also on dry hill-sides, from Canada and New England to Texas and Arizona; also in Alaska, Europe, Western Asia, Madeira, and the Azores."

The first writer who mentions *O. vulgatum* as an English plant is Wm. Turner, who, in the third part of his "Herball," published in the year 1568, says, "The Adder's-tongue or Ophyoglosson, groweth in moyst medowes in the end of April." It was formerly credited with wonderful medical properties, and in some parts of the country it is still used as an application to fresh wounds, country-people knowing it as "Adder's-spear ointment."

This species has an erect or sometimes creeping, but not tuberous, rootstock, with fleshy roots extending horizontally, often to a distance of several inches. Occasionally one of them forms an adventitious bud, and produces a new plant at some little distance from the old one. Only one frond is commonly produced each year, and the fronds of successive years face in opposite directions. Their size generally varies, according to the elevation at which it grows, to such an extent that those specimens found in grassy, damp meadows at West Felton, Shropshire; Blymill, Staffordshire; or Wrexham, in Wales, are four times as large as those gathered in Dalmeny Wood, near Edinburgh, or near Richmond, in Yorkshire. The frond for the year grows from just below the summit of the rootstock. At the base of the stalk there is a short sheath, which encloses a pointed bud containing the undeveloped frond for the next year's growth; and, according to Hofmeister, even the rudiments of the frond for another year may be detected within the same bud. The length of the frond generally varies from 3in. to 12in.; its stem is pale green, round, and hollow; the barren division, 2in. to 4in. long and 1½in. to 2in. broad, is egg-shaped, sessile (stalkless), sheathing the stem, nearly upright, and disposed about half-way on the stem, which terminates in the fertile spike 1in. or more in length. Thus the fructification, which considerably overtops the barren division when the plant is fully developed, appears to rise from within the base of the barren portion, and forms a somewhat tongue-like organ, with the spore masses disposed in a line along each of its two edges. The spores are embedded in roundish, yellow masses, which, gaping when the spores have escaped, present a series of clefts along each edge of the fertile spike.—*Hooker*, *British Ferns*, t. 46. *Nicholson*, *Dictionary of Gardening*, ii., p. 500. *Eaton*, *Ferns of North America*, ii., t. 81. *Lowe*, *Ferns British and Exotic*, vii., t. 65A. *Correvon*, *Les Fougères rustiques*, p. 161.

This species appears to have produced several varieties, the most distinct of which are as follow :

O. v. ambiguum—am-big′-u-um (ambiguous).

This variety, for the name of which we can find no authority, is given by Nicholson as a native of Orkney, Wales, &c., and appears to be similar to the one described by Lowe as *O. minor*, and found by Mr. Syme in Orkney. It is a smaller form than the type, with narrow-oblong, shorter fronds, the fertile portion of which is borne on a comparatively longer stalk.—*Nicholson, Dictionary of Gardening*, ii., p. 500.

O. v. pedunculosum—ped-un-cul-o′-sum (stalked), *Desvaux.*

In this variety the barren division is like that of the typical plant in form and size, but it is thinner in texture and shows a distinct stalk. It is a native of India.—*Nicholson, Dictionary of Gardening*, ii., p. 500.

O. v. polyphyllum—pol-yph-yl′-lum (having several leaves), *A. Braun.*

This North American variety usually produces at the same time three to five fronds. The common stalk is generally a little shorter than the peduncle of the fruiting spike, but this varies in proportion according to the habitat.—*Eaton, Ferns of North America*, ii., p. 262.

CHAPTER VI.

OSMUNDA, *Linnæus.*

(Os-mun′-da.)

Flowering Ferns.



F the sub-order *Osmundaceæ* this genus forms the most important division. It is composed of plants with fronds either pinnate or bipinnate (once or twice divided to the midrib), and readily distinguished through their fructification being totally distinct from the leafy part of the frond, forming a contracted portion disposed into simple or compound sporangiferous panicles (spore-bearing branches). In some species, such as *O. cinnamomea*, the barren and fertile fronds are different, one lot of fronds being sterile and the others fertile; in other species, where fertile and barren on the same frond, the upper portion in some cases, as, for instance, *O. regalis*, and the middle part of the frond in others, *e.g.*, *O. Claytoniana*, only is fertile. In Hooker and Baker's "Synopsis Filicum" *Osmunda* forms Genus 62. The name is of uncertain origin. Sir W. J. Hooker ("British Ferns," p. 45) refers to Sir J. Edward Smith's conjecture that the word comes from the Saxon *osmund*, meaning "domestic peace." He also quotes from Gerarde, that in "olden times it was called Osmund the Waterman, and the whitish portion of the rootstock (which, boiled or else stamped and taken with some kind of liquor, is thought to be good for these that are wounded . . .) is called the heart of Osmund the Waterman." The accepted derivation of the word *Osmunda* is, however, more generally admitted as Osmunder, the Saxon name of the Scandinavian god, Thor. The genus is represented in England by the "Royal Fern," *O. regalis*, only.

Culture.

Though not extensive, this highly interesting genus comprises some species which are very ornamental in a cool house; while some make beautiful objects for the hardy Fernery. Like many other genera comprising Ferns which are generally termed British, the genus *Osmunda* has a wide range of distribution, and it therefore contains a great variety of forms. They are scattered all over Europe, Asia, South Africa, the West Indies, and North America; and, although it may be truly said that all the known representatives of the genus are worthy of cultivation, none, perhaps, are more useful than, and at the same time so accommodating as, the North American species, which stand even our most severe winters out-of-doors quite unprotected. Kinds from Arkansas, Florida, North Carolina, Newfoundland, Louisiana, Canada, &c., require no more protection than our own *O. regalis*. Osmundas are commonly called "Flowering Ferns," and are on that account regarded with more than usual interest. Most of them are deciduous, and, with the exception of *O. javanica*, whose general appearance is much more that of a glossy, thick-foliaged Lomaria than that of anything else, they all more or less resemble one another. Although one sometimes hears of *Osmunda regalis* measuring 10ft. in height, the length of the fronds of most species in cultivation varies between 2ft. and 3ft. In dryish marshes they seldom attain more than 1¼ft. in height, and stand quite erect; while, in plants which have had the advantage of growing in places suited to them, the beautiful fronds attain their full development, and, curving outward, form objects of such stately beauty that some species well deserve the popular appellation of "Royal Fern."

Osmundas are easily cultivated, even in common garden soil; but if planted out, a spot should be selected for them by the side of water, so that, while the heads of the plants are in the open and fully exposed to the air, the roots may be kept constantly wet. In the Chelsea Botanic Gardens they are even grown to perfection in a tank, in which they have been standing for years; and if anyone will take the trouble to prepare for these magnificent Ferns a mixture of swamp mud and good loam, and will keep their roots supplied with abundant moisture, the result will be all that can be desired. If, however, there is any difficulty in procuring the materials

just named, a mixture of turfy loam and fibrous peat will suit them very well, and the addition of a portion of river sand will induce the development of roots, which will run in all directions, and thus insure the production of numerous robust fronds. Though requiring an abundance of water at the roots at all times of the year, the plants dislike being syringed overhead.

The propagation of Osmundas is invariably effected by means of spores, which are produced in abundance and germinate very freely.

Principal Species and Varieties.

O. bipinnata—bip-in-na′-ta (twice pinnate), *Hooker*.

This is a handsome, greenhouse, evergreen species, native of Hong-Kong. It has at different times and by various firms been imported into this country; yet, notwithstanding its good habit and generally useful qualities, it remains very scarce. In general appearance it somewhat resembles the better-known *O. javanica*, from which, however, it differs in not having simply-pinnate fronds. The fronds of *O. bipinnata*, which are produced in great abundance from an upright-growing rootstock, are, as the specific name implies, bipinnate, their leaflets not being simply pinnatifid, but clearly and distinctly pinnate again, a few of the terminal ones only excepted. They are borne on tufted, rather slender, glossy stalks 1ft. or more in length, and measure 1½ft. to 2ft. in length and 6in. to 10in. in breadth. The leaflets, of a somewhat leathery texture, are of a shining nature while on the plant, although perfectly destitute of gloss when in a dry state; they are 3in. to 4in. long, 1in. broad, and oblong-spear-shaped. The upper leaflets are barren and simple (undivided); below these are several pairs provided with winged stalks, and, on each side, numerous entire, oblong pinnules (leafits), which are closely set, nearly overlapping, about ½in. in length, bluntish, and quite stalkless. The fertile part consists of three or four opposite pairs of pinnæ (leaflets), with several cylindrical leafits on each side, ¼in. to ½in. long. These fertile segments are much contracted, covered with fructification, and of a pleasing light brown colour. Its compact, though somewhat stiff, habit, and the leathery texture of its shining, dark green fronds, render this species very useful, as the fronds remain on the plant a very long time.—*Hooker*, *Filices Exoticæ*, t. 9.



Central Avenue of the Conservatory, Chatsworth.

O. cinnamomea—cin-nam-o′-mĕ-a (cinnamon-coloured), *Linnæus*.

This very handsome and perfectly hardy species, which, according to Lowe, was introduced into the Royal Gardens, Kew, as far back as 1772, has a wide range of habitat. It is usually considered as a purely North American plant, being a native of Florida, Louisiana, and Newfoundland, where it is most abundant in low grounds and moist copses; but these are not its only habitats, as Eaton, in his excellent work on "Ferns of North America," states (vol. i., p. 220) that Bourgeau collected it near Sturgeon Lake, some hundred miles north-west of Lake Superior, and Milde gives Lake Winnipeg as a station for it. It is besides known as an indigenous plant from Newfoundland to Mexico, in the West Indies, Guatemala, New Granada, Brazil, Japan, Manchuria, &c. It is of robust growth and compact habit, and when deprived of fertile fronds its general appearance is very similar to that of *O. Claytoniana* (or *O. interrupta*, as that species is usually called in gardens); in fact, in the absence of fructification it is not always easy to distinguish one from the other. When well grown, the crown of fronds of this species rivals in density that of *O. Claytoniana*, and the barren fronds, which in this case are by far the more numerous, are of almost the same shape and dimensions as those of that species. *O. cinnamomea* is generally of more upright habit, but the most striking difference between the two species, discernible only when in a barren state, is that in the plant under notice the summit of the frond is decidedly sharp-pointed, as is also the summit of each



Fig. 9. Osmunda cinnamomea (much reduced).

particular leaflet. The barren fronds, borne on stout, round stalks 1ft. to 1½ft. long, often measure 2ft. to 3ft. in length and 6in. to 9in. in breadth; they are furnished with closely-set leaflets 3in. to 4in. long, about 1in. broad, and cut down nearly to the rachis (stalk of the leafy portion) into close, entire, blunt, oblong lobes of a somewhat leathery texture. When fertile, this species cannot be mistaken for any other known kind, as the fertile fronds rise from the centre of it in early spring; they are much smaller than the barren ones, and at first are densely covered with light brown tomentum (wool), but when fairly uncoiled, the abundant spore masses give them the characteristic cinnamon-brown colouring not found in any other known kind. The fertile fronds are usually the first to make their appearance, and in that respect again differ from all other known Osmundas; but the barren ones soon follow them, and when regularly disposed they form as it were a magnificent green vase, within which the plumes of fructification stand erect (Fig. 9). Normally the fronds are either entirely fertile and then devoid of any green tissue, or wholly barren and of a pleasing light green colour; but it is not unusual to find fronds in which some of the lower leaflets are leafy, while others, mainly barren, have their summit wholly or partly transformed into fructification. Such fronds are, however, mere accidents: their reproduction is not to be depended upon, even on the same individual plant, which seldom retains this character, and therefore cannot rank as a distinct variety.—*Hooker*, *Synopsis Filicum*, p. 426. *Nicholson*, *Dictionary of Gardening*, ii., p. 530. *Eaton*, *Ferns of North America*, i., t. 29. *Lowe*, *Ferns British and Exotic*, viii., t. 1.

O. Claytoniana—Clay-to′-nĭ-a′-na (Clayton's), *Linnæus.*

This thoroughly hardy species, better known perhaps in gardens under the name of *O. interrupta*, is an extremely handsome and highly decorative plant, native of North America, where it grows luxuriantly in low grounds and wet thickets, and especially delights in alluvial soil. According to Eaton, it is very abundant from Newfoundland to Lake Superior, and its natural habitat extends southwards to the mountainous regions of Arkansas, Kentucky, and North Carolina, if not farther; it has even been found, though in limited numbers, on the Himalayas, up to 10,000ft. elevation.

Of all the known kinds of *Osmunda*, this is undoubtedly the one in which the combination of the curious and beautiful is most conspicuous.

When growing in a favourable situation and allowed ample room, it forms a crown of fronds several feet in diameter. The outer fronds, which are generally barren, are borne on tufted, loosely-woolly stalks, which are 1ft. or more in length and clothed with loose, woolly material when young, though naked when mature; they rise nearly erect on their stalks, but, instead of retaining their upright position, like those of *O. cinnamomea*, they gradually bend away from the centre and curve outwards in all directions (Fig. 10), thus forming a most elegant, vase-shaped plant of large dimensions. The fronds are usually 1ft. to 2ft. long, 8in. to 12in. broad, and furnished with barren spear-shaped leaflets 4in. to 6in. long, 1in. or more in breadth, and cut down nearly to the rachis into close, oblong, entire lobes, of a soft, papery texture and pale green colour. The fertile fronds, which are usually taller, stand close together, nearly upright, in the centre of the crown, and present a most peculiar appearance, not shared by any other known species: in this case the fertile fronds do not bear their fructification at the extremity, as is the case with *O. regalis*, nor are they ever of totally distinct form. The fertile leaflets are situated somewhere near the centre of the frond, most frequently a little above the middle. Above these fertile leaflets the barren ones again appear (see Fig. 11, reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author), and this upper part of the frond, in which the leaflets are much more closely set, is more or less curved outward, like the entirely barren fronds. When the fronds first rise from the thick, massive rootstock, of a woody nature, from which they are produced, both barren and fertile ones are alike covered with a light brown coating of entangled, webby fibres, which, however, are shed during the early summer, when both kinds of fronds, with



Fig. 10. Osmunda Claytoniana (much reduced).

the roundish stalks on which they are borne, become nearly smooth and of a bright green colour, a little of the wool in the axils of the leaflets and along the midrib alone remaining. The distinction as regards the bearing of the barren and fertile fronds is not always to be depended upon, especially in plants of moderate growth. For instance, in one frond the third leaflet on one side is barren, while its neighbour is barren at the base but fertile in the upper part; in another frond there are five fertile leaflets on one side and only three on the other; in some other instances there are only five pairs of barren leaflets on each side below the fertile ones, whereas there may be ten or twelve pairs above them, but in any case there are no fronds entirely fertile.—*Hooker*, *Synopsis Filicum*, p. 426. *Nicholson*, *Dictionary of Gardening*, ii., p. 530. *Eaton*, *Ferns of North America*, i., t. 29. *Beddome*, *Ferns of British India*, t. 187. *Lowe*, *Ferns British and Exotic*, viii., t. 2.



Fig. 11. Portion of Frond of Osmunda Claytoniana (much reduced).

O. gracilis — grac′-il-is (slender). A variety of *O. regalis.*

O. interrupta — in-ter-rup′-ta (interrupted). This is a common garden name for *O. Claytoniana.*

O. japonica — jap-on′-ic-a (Japanese). This and *O. j. corymbifera* are varieties of *O. regalis.*

O. javanica—ja-van′-ic-a (Javanese), *Blume.*

A handsome and very distinct, stove species, also known as *O. Presliana* and *O. Vachellii.* It is of somewhat rigid habit, and is found growing in

a natural state from Kamtschatka to Java and Ceylon. The peculiar fronds, which in general appearance greatly resemble those of a Lomaria, are 1ft. to 3ft. long, 8in. to 12in. broad, and simply pinnate (only once divided to the midrib), being provided with leaflets distinctly barren or fertile. The barren ones, of a leathery texture, dark green colour, and glossy, are 4in. to 8in. long, ½in. to ¾in. broad, wedge-shaped at the base, and often slightly stalked, their edge being either entire or sometimes sharply toothed. The fertile leaflets, which are usually disposed on each side of the rachis (stalk), and in the centre of the frond, are shorter, and made up of numerous close but distinct, oblong, sessile (stalkless) clusters. Fig. 12 is reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author.—*Hooker*, *Icones Plantarum*, t. 15. *Nicholson*, *Dictionary of Gardening*, ii., p. 530.



Fig. 12. Portion of Frond of Osmunda javanica (¼ nat. size).

O. lancea — lan′-cĕ-a (lance-like), *Thunberg.*

This is a greenhouse species, of small dimensions, native of Japan, and with barren and fertile fronds totally distinct. The barren ones, about 1ft. long, are oblong in shape and acuminate (ending in a long, tapering point). Their leaflets, about 5in. long and of a somewhat leathery texture, are oblong, acuminate, and short-stalked, the lowest being rather reduced; they are again divided into narrowly spear-shaped leafits, 1¾in. long, ¼in. broad, narrowed at both ends, stalkless, and slightly toothed upwards. The fertile fronds are ternato-decompound (divided into

leaflets arranged by threes).—*Hooker*, *Synopsis Filicum*, p. 427. *Nicholson*, *Dictionary of Gardening*, ii., p. 530.

O. palustris—pal-us′-tris (marsh-loving). A variety of *O. regalis.*

O. Presliana—Presl-ĭ-a′-na (Presl's). Synonymous with *O. javanica.*

O. regalis—re-ga′-lis (royal), *Linnæus.*

This handsome and deservedly popular species, which for stateliness has no equal in the whole genus, though generally considered as a British Fern, may well be classed among the most useful and most decorative of the exotics of strong growth, as, according to Beddome, it is found abundantly on the banks of rivers and streams on the Neilgherries and other high mountains on the western side of the Madras Presidency; while Eaton states that it also occurs in great quantities in marshes and wet woods, and by the margins of ponds and streams, throughout North America. In fact, the "Royal Fern" is met with in all parts of the world, from Sweden to Siberia, in Japan, the Azores, Barbary, China, Cape Colony, &c.

Though not by any means common in all parts of the United Kingdom, in places congenial to its growth *O. regalis* is found plentifully, and in such positions grow into huge masses. It is recorded that on the banks of the Clyde Mr. S. Murray measured a tuft which was 11½ft. high ("British Ferns," by George W. Johnson, 1861, p. 197). In Wales and in Ireland it is somewhat scarce, and is only recorded in the latter country as growing wild in Kelly's Glen, co. Dublin, in Castlebar, co. Mayo, and in Muckross Abbey, co. Kerry. This is all the more singular, as, on account of the boggy nature of a great portion of the Emerald Isle, and also by reason of its climatic conditions, the growth of *O. regalis* would naturally appear to be favoured there. The plant is more plentiful in Scotland, where it is found at the head of Loch Fyne, to the north-east of Inverary, Argyleshire, on the Dumbarton side of Loch Lomond, at the side of the Loch of Inclinedamff, Sutherlandshire, in Aberdeenshire, and on the coast of Kincardineshire. But it is in England that the Royal Fern is specially at home, for it is found there over a most extended area; from the Goodhilly Downs, near St. Ives, and in the mouths of old mines near Marazion and Cosgarne, in Cornwall, and on the cliffs near Dawlish, near Chudleigh, on the banks of

the Teign, and at Ivy Bridge, on the Erme, in Devon, to Speke, between Crosby and Formby, and on Chat Moss, near Liverpool, as well as from Lowgelt Bridge, Allowby, and Keswick, in Cumberland, to Leith Hill and near Dorking, in Surrey. It is also found in the Isle of Man, the Isle of Wight, Warwickshire, Kent, and many other places too numerous to be mentioned. Of all Ferns belonging to the Flora of Great Britain, probably *O. regalis* is the one which most attracted the attention of early writers, for we find that Gerarde, in his "Herbal," published in 1597, speaking of this Fern, says: "It groweth in the midst of a bog at the further end of Hampstead Heath, from London, at the bottome of a hill adjoyning to a small cottage, and in divers other places; as also upon divers bogges on a heath or common neere unto Bruntwood, in Essex, &c., &c." Things have greatly changed since Gerarde's time in regard to British plants of all kinds whose habitats were situated in the vicinity of large towns.



Fig. 13. Portion of Frond of Osmunda regalis (½ nat. size).

O. regalis is the typical Flowering Fern, and in this country varies little in general appearance. Its rootstock is so covered with overlapping stalk-bases of former growths and by interlacing roots that the whole forms a massive, spongy clump of great thickness; and a peculiarity of this species resides in its sending out strong, blackish rootlets in great abundance, some of which creep in an upward direction between the scales, while others pierce directly through them, thus binding the whole together and giving it great strength and solidity. Most of the

fronds, which are borne on firm, erect, naked stalks 1ft. to 1½ft. long, and are of variable length and more or less graceful habit, according to the position in which the plants grow, are barren and strictly bipinnate (twice divided to the midrib). When fertile they have their upper part transformed into a bipinnate, panicled mass of fructification formed of cylindrical leafits (see Fig. 13, reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author). The barren leaflets, 6in. to 12in. long and 2in. to 4in. broad, are furnished with stalkless or short-stalked leafits 1in. to 2in. long, ¼in. to ¾in. broad, of a soft, papery texture, and of a full, herbaceous green colour.—*Hooker*, *British Ferns*, t. 45. *Nicholson*, *Dictionary of Gardening*, ii., p. 530. *Eaton*, *Ferns of North America*, i., t. 28. *Beddome*, *Ferns of Southern India*, t. 76. *Lowe*, *Ferns British and Exotic*, viii., t. 3. *Druery*, *Choice British Ferns*, p. 113.

If grown in pots, the Royal Fern must have good drainage and an abundant and continuous supply of water. It is easy of cultivation, within the reach of all Fern-lovers, and may be readily propagated from spores, which germinate freely.

O. r. cristata—cris-ta′-ta (crested), *Moore*.

This very decorative form is the only really striking British variety of the Royal Fern. It differs essentially from the typical species, not only in its totally distinct habit, but also in the size of its fronds, which are much shorter and much more massive: not only is their summit heavily tasselled, but all the leaflets bear at their extremity a large, overlapping crest, which of course gives the plant a more drooping aspect. The whole plant, of a compact habit, seldom reaches over 2ft. in height, and is of a darker green colour than the species. The foliage, being of a substantial texture, possesses the advantage of remaining on the plant a much longer time than that of any other Osmunda of the bipinnate section. *O. r. cristata* is quite as hardy as the popular species, and readily reproduces itself from spores, which are very abundant.—*Nicholson*, *Dictionary of Gardening*, ii., p. 530. *Druery*, *Choice British Ferns*, p. 114.

O. r. gracilis—grac′-il-is (slender), *Link*.

This variety, which is also found in gardens under the name of *O. spectabilis*, is a charming, delicate-looking Fern, native of North America,

with bipinnate (twice-divided) fronds about 1ft. long, borne on slender stalks of the same length; they are furnished with numerous and distantly-placed leaflets, each of which has from six to eight pairs of leafits and a larger terminal one, all being short-stalked and of a pale green colour. For Fig. 14 we are indebted to Messrs. W. and J. Birkenhead.—*Lowe, Ferns British and Exotic*, viii., t. 4.

O. r. japonica—jap-on′-ic-a (Japanese), *Thunberg.*

In this curious, greenhouse variety, which is found in Japan and on the Himalayas, the barren and fertile fronds are often quite distinct, the latter being developed first and soon disappearing. It also occasionally happens that some of the lateral leaflets become fertile, whilst the terminal ones remain barren.—*Hooker, Synopsis Filicum*, p. 427.



Fig. 14. Osmunda regalis gracilis (much reduced).

O. r. j. corymbifera—cor-ymb-if′-er-a (corymb-bearing), *Moore.*

This very distinct and beautiful, Japanese Fern, of dwarf habit, is unquestionably the best Osmunda for decorative purposes, and especially for pot culture, yet introduced (see Plate, for which we are indebted to Messrs. W. and J. Birkenhead). Its fronds are crowded; their stalks, quite smooth, slender, and of a bright rosy-pink colour, rise to a height of about 4in., and support fronds of triangular outline that bend away almost horizontally from the common centre in all directions. In young plants each rachis or midrib usually carries two pairs of opposite leaflets and a terminal one; each of the lower leaflets has a short footstalk, and a spear-shaped or nearly oblong blade, which has two rather larger lobes at the base and is cut at the summit into

several rounded divisions; occasionally the blade forks and each division is crested. The second or anterior pair of leaflets are shorter, almost stalkless, without basal lobes, and with the divisions at their extremity less divided. The terminal leaflet more or less resembles those of the lowest pair. The compact, dwarf habit of the plant, the distinct cristation of the leaflets, and



Fig. 15. Osmunda regalis palustris
(¼ nat. size).

the peculiar soft colour of the fronds, which makes a pleasing contrast to every other Fern, combine to give this Osmunda a unique character. Its fertile fronds, which are generally quite distinct from the barren ones, are produced very sparingly and of short duration. This variety reproduces itself true from spores; although usually deciduous, it retains its foliage all the year when kept in a warm greenhouse.—*Nicholson*, *Dictionary of Gardening*, ii., p. 530.

O. r. palustris—pal-us′-tris (marsh-loving), *Sturm.*

This diminutive form of the Royal Fern is of an evergreen nature, and, though quite hardy in ordinary seasons, succeeds best under greenhouse treatment. It is a native of Brazil, and possesses some very useful decorative qualities. The slender and elegant fronds are abundantly produced from a woody rootstock; they are upright or slightly arching and bipinnate (twice divided to the midrib), with oblong leafits generally entire, except the terminal one, which is larger than the others and frequently lobed (see Fig. 15 and Coloured Plate). The stalks are of about the same length as the leafy portion of the fronds, of a bright crimson, and quite smooth. On first unfolding, the young fronds are of a beautiful rosy-crimson tint, which is gradually replaced by a pale green colour. This variety reproduces itself readily from spores, which are abundantly produced and germinate very freely.—*Nicholson, Dictionary of Gardening*, ii., p. 530.

O. spectabilis—spec-ta′-bil-is (showy). Synonymous with *O. regalis gracilis.*

O. Vachellii—Va-chel′-lĭ-i (Vachell's). This is identical with *O. javanica.*

PARAGRAMMA—Par-ag-ram′-ma. *See* **Polypodium.**

PATANIA—Pat-an′-ĭ-a. *See* **Dicksonia.**

CHAPTER VII.

PELLÆA, *Link.*

(Pel′-læ-a.)

Cliff Brake Ferns.

THE name of this genus is derived from *pellos*, dark-coloured, in reference to the dusky colour of the fronds of certain species. Pellæas, which in Hooker and Baker's "Synopsis Filicum" form Genus 30, may be considered an important and very interesting section of the tribe *Pterideæ*. In habit of growth, as also in geographical distribution, they are closely allied to *Cheilanthes*, from which they differ principally through the continuous nature of their involucre (covering of the spore masses). The distinguishing characters of the plants belonging to this genus reside in the disposition of the sori (spore masses), which are intramarginal (within the margin), terminal on the veins, which in nearly all cases are free, at first dot-like or decurrent on the veins, but soon running into a line; also in the character of the involucre, which is formed of the more or less changed edge of the frond, quite continuous and sometimes very narrow. This genus is widely distributed and comprises about sixty species of stove and greenhouse Ferns; but it has no British representative. According to the presence or absence of various distinctive characters, *Pellæa* has been subdivided into four sections as follow:

Allosorus (All-os-o′-rus), *Presl.* The plants of this section have fronds of a leathery texture, in which the veins are not perceptible. The ultimate segments of the frond are at least twice as long as broad, often revolute at the margin, and the involucre is broad and conspicuous. One of the species

best illustrating this section is *P. atropurpurea*. Two other species formerly known under the name *Allosorus* are now classed under *Cryptogramme* and *Pteris* respectively.

Cheiloplecton (Cheil-op-lec′-ton), *Fée*. The foliage of the plants comprised in this section is either of a soft, papery texture or somewhat leathery, and the veins are clearly visible; the involucre is broad, and, in most of the species, is rolled over the spore masses till full maturity. This section is best represented by *P. gracilis*.

Holcochlæna (Holc-och-læ′-na), *Baker*. In this very small section the plants much resemble in texture those of *Platyloma*, and are provided with the same very narrow involucre; in fact they only differ through their reticulated venation (netted veins), as may be remarked in *P. Burkeana*.

Platyloma (Plat-yl-o′-ma), *J. Smith*. This forms perhaps the most distinct section of the genus, the fronds of the plants belonging to it being of a leathery texture, with the veins usually hidden and the ultimate segments broad and flat. Another distinctive character resides in the nature of the involucre, which is so narrow that it is soon hidden by the fruit. A very good representative of this section is *P. rotundifolia*.

Culture.

This genus contains many gems among Ferns which, as regards beauty and usefulness, may be said to vie with *Cheilanthes*, *Gymnogramme*, and *Nothochlæna*. Coming as they do from various and distantly-situated parts of the globe—from North and South America, New Zealand, the Himalayas, the Cape of Good Hope, Madagascar, &c.—they are well adapted for the ornamentation of the stove and of the greenhouse alike; such species as *P. falcata* and *P. rotundifolia* are, in fact, very nearly hardy in some favoured parts of this country. All the Pellæas are of small or medium dimensions, and are very useful for planting in rockeries or in small hanging baskets, in which positions they are much more effective than when grown in pots. The greater number of these plants being found growing in a natural state amongst the crevices of rocks, it is at once obvious that they require but little soil, and that a comparatively exposed situation suits them best. They flourish in a compost of a light and very porous nature, such as a mixture of two

parts peat, one part loam, and one part silver sand, or, better still, pulverised old mortar, in which their thin, fibrous roots delight to run. Pellæas should not at any time be allowed to get dry at the roots; yet, on the other hand, their foliage should never be wetted. They prefer being kept close to the light, which is never too strong for them, provided they are sheltered from the direct rays of the sun.

Most of the known species of *Pellæa* are readily propagated by means of spores, which are abundantly produced and germinate freely. Those species which are provided with running rhizomes may be propagated by division, which operation is most successfully effected during March and April.

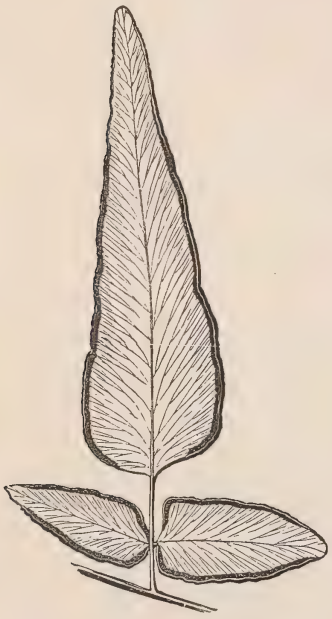


Fig. 16. Portion of Frond of Pellæa adiantoides (nat. size).

Principal Species and Varieties.

P. (Platyloma) adiantoides—Plat-yl-o′-ma; ad-ĭ-ant-ŏ-i′-dēs (Adiantum-like), *Lowe.*

This handsome, vigorous, greenhouse species, better known in gardens, where it is very extensively grown, under the names of *Pteris adiantifolia*, *P. adiantoides*, and *P. latifolia*, is a native of the West Indies. Its handsome fronds, borne on black stalks 1ft. or more in length and of a shining nature, are 1½ft. to 2ft. long, broadly egg-shaped, and bipinnate (twice divided to the midrib). They are furnished with leaflets which, at the base of the frond, have from seven to ten leafits, the rest gradually decreasing upwards to a simply pinnate apex. The leafits are egg-shaped and bluntly toothed when barren, more entire and sharp-pointed when fertile; those next to the midrib are occasionally auricled (eared) at the base, while the terminal one is usually somewhat halbert-shaped. The sori (spore masses) form a narrow, continuous line along the margins (Fig. 16). The whole plant is of a particularly dark green colour, and its general appearance is that of a large form of *P. hastata.*—*Lowe*, *Ferns British and Exotic*, iii., t. 33.

P. (Allosorus) alabamensis — All-os-o′-rus ; al-ab-a-men′-sis (from Alabama), *Baker*.

Cheilanthes alabamensis, of Kunze, is another name for this very pretty, greenhouse species, which, according to Eaton, is found growing wild on rocks—certainly on sandstone, and perhaps on lime rocks—along the banks of the rivers of Eastern Tennessee, and the Western parts of Virginia and North Carolina ; in Franklin County, Kentucky ; in the valley of the Cohaba River, Alabama ; at the mouth of Rio Pecos, Texas ; and along the lower Rio Grande. The broadly-egg-shaped fronds, borne on wiry, polished, blackish stalks 2in. to 4in. long and covered at the base with fine woolly scales of a reddish-brown colour, are produced from a short-creeping and branched rootstock, which is covered with similar scales. They are 4in. to 8in. long, 1½in. to 2in. broad, bi- or tripinnatifid (twice or three times divided nearly to the midrib), and furnished with numerous leaflets of a somewhat leathery texture. The leaflets are closely placed and cut down nearly to the midrib into numerous narrow-oblong segments, most of which are entire, but the lowest are sometimes again pinnatifid ; they are naked on both surfaces, and the sori (spore masses) are covered by a rather broad involucre of a parchment-like texture.—*Hooker*, *Species Filicum*, ii., p. 89, t. 103B ; *Filices Exoticæ*, t. 90. *Eaton*, *Ferns of North America*, ii., t. 57.

P. (Allosorus) ambigua—All-os-o′-rus ; am-big′-ŭ-a (ambiguous), *Baker*.

A greenhouse species, native of New Granada, with fronds oblong, simply pinnate (once divided to the midrib), or bipinnate at the base, and borne on wiry, erect, polished, dark chestnut-brown stalks 6in. to 9in. long. These fronds are usually 4in. to 6in. long, 2in. to 3in. broad, and furnished with narrow leaflets 1½in. long and of a somewhat leathery texture, with their margin incurved. The brown, continuous involucre, of a papery texture, is mapped out into a series of roundish depressions, the two opposite edges interlacing by a marginal fringe, and sometimes concealing the dark, polished midrib.—*Hooker*, *Synopsis Filicum*, p. 147.

P. (Allosorus) andromedæfolia—All-os-o′-rus ; an-drom′-ed-æ-fol′-ĭ-a (Andromeda-leaved), *Fée*.

A comparatively strong-growing, greenhouse species, native of California, and extending southward along the Andes of Chili, also of Cape Colony. Its

very elegant fronds, borne on strong, upright stalks 6in. to 9in. long, of a pale brown colour, and clothed at the base with reddish-brown scales, are broadly egg-shaped, 6in. to 12in. long, and tri- or quadripinnate (three or four times divided to the midrib). The leaflets, of a rigid nature, are broadly spear-shaped; the lowest are furnished with several narrow-oblong leafits, the lower segments of which are sometimes slightly branched; the ultimate divisions, seldom more than ⅛in. long, are narrow-oblong, blunt, with enrolled edges; all are of a leathery texture, with both surfaces naked. The wrinkled involucre is scarcely changed from the substance of the frond, sometimes nearly meeting edge to edge.—*Hooker*, *Species Filicum*, ii., p. 149. *Nicholson*, *Dictionary of Gardening*, iii., p. 66.

P. (Holcochlæna) angulosa — Holc-och-læ′-na; ang-ul-o′-sa (angular), *Baker*.

A strong-growing, stove species, native of Mauritius, Bourbon, and Madagascar. The stalks of the fronds are strong, upright, 6in. to 12in. long, of a dark chestnut-brown colour and polished nature. The fronds are sub-deltoid (somewhat in shape of the Greek delta, Δ), being 6in. to 12in. each way and twice or three times divided to the midrib. The upper leaflets are simple and cordate (undivided and heart-shaped), stalked, 1in. to 1½in. long, and ½in. to ¾in. broad; their margin is not toothed but is sometimes undulated. The lower leaflets are more spear-shaped than the upper ones, and are furnished with several similar leafits ½in. or more apart, sometimes divided again below. All are of a leathery texture, with both surfaces naked, but their midrib is hairy and their veins are copiously netted. The sori (spore masses) are disposed in a continuous line to the summit of the segments, ultimately concealing the reflexed involucre.—*Hooker*, *Species Filicum*, ii., p. 214, t. 126A.

P. (Allosorus) angustifolia—All-os-o′-rus; an-gus-tif-ol′-ĭ-a (narrow-leaved), *Baker*.

This strong-growing, stove species, native of Mexico and Venezuela, is described and figured in Hooker's "Species Filicum" under the name of *P. decomposita*, which name has been abandoned. Its much-divided fronds, 6in. to 12in. long and 3in. to 6in. broad, are borne on strong, erect, naked

stalks 6in. to 12in. long and of a dark chestnut-brown colour. They are broadly oblong, quadripinnatifid (four times divided nearly to the midrib), and furnished with broadly spear-shaped leaflets, the pinnules (leafits) of which are often cut down to the midrib into numerous narrow segments with rolled edges. The fronds are of a somewhat leathery texture and of a pale green colour on both surfaces, the upper one being slightly hairy. The broad involucre, of parchment-like texture, is rolled over the spore masses.—*Hooker*, *Species Filicum*, ii., p. 151, t. 119B.

P. a. cuneata—cun-ĕ-a′-ta (wedge-shaped), *J. Smith.*

In this variety, which is of the same habit and possesses the same vigour as the species, the ultimate segments are usually cut down to the midrib, oblong, pointed, ¼in. long, ⅛in. broad, and wedge-shaped at the base.—*Nicholson*, *Dictionary of Gardening*, iii., p. 66.

P. (Allosorus) aspera—All-os-o′-rus ; as′-per-a (rough), *Baker.*

This greenhouse species, native of Texas and New Mexico, growing near the Rio Grande, near the Santa Pita Copper Mines, and along the San Pedro River, is rare, even in its own habitats. Its narrowly spear-shaped fronds, 4in. to 6in. long and about 1in. broad, are produced from a somewhat ascending, rather short rootstock, and borne on clustered, rather slender stalks of a wiry nature, 2in. to 3in. long, blackish, and more or less densely clothed with narrow scales and hairs of a pale brown colour. They are bipinnate, with their lower leaflets distant and the others more closely set, and all of them are cut down to the midrib into a few narrow or oblong, nearly entire leafits of a somewhat leathery texture, pale green on both surfaces, the upper one rough with harsh, short, simple or forked, whitish hairs. The abundant sori (spore masses) are disposed in a continuous line along the margin, and are covered by a pale, minutely-toothed involucre.—*Hooker*, *Species Filicum*, ii., p. 111, t. 108A. *Eaton*, *Ferns of North America*, ii., t. 74.

P. (Allosorus) atropurpurea—All-os-o′-rus ; a′-tro-pur-pur′-ĕ-a (dark purple), *Link.*

This greenhouse or nearly hardy species, of medium size, which, according to Lowe, was introduced into Europe in 1770, is stated by Eaton

to grow in crevices of shaded, calcareous rocks, from Canada to the Rocky Mountains of British America, and southward to Alabama, Arkansas, the Indian Territory, and Arizona; it has also been found in several parts of Mexico, and even in South America, in the Andes of Mecoya, where it is said to grow at 8000ft. to 10,000ft. elevation. Having been first collected about 1736, on the shore of the River Rappahannock, in a shady place by the root of a Juniper, near the promontory called Point Lookout, Eaton takes pleasure in giving it an English name, and calls it "Clayton's Cliff Brake."



Fig. 17. Fertile Pinna of Pellæa atropurpurea (nat. size).

According to the age of this plant, its fronds, which are produced from a short, knotted rootstock, and borne on upright, rigid, though slender stalks 3in. to 4in. long and more or less woolly, are of different forms and dimensions (see Plate). They vary from 4in. to 12in. in length, from 2in. to 6in. in breadth, and from spear-shaped and simply pinnate (only once divided to the midrib) to broadly spear-shaped and furnished with deltoid pinnæ (leaflets in shape of the Greek delta, Δ), bearing on each side several nearly stalkless leafits 1in. to 2in. long, seldom more than ¼in. broad, entire or sharply auricled (eared) at one or both sides at the base (Fig. 17). The fronds are of a leathery texture and of a bluish colour, which forms a very pleasing contrast with the chestnut-brown tint of the stalks and midribs. The involucre, which is formed of the slightly-altered, incurved edge of the leafits, is eventually almost hidden by the broad line of fructification.—*Hooker*, *Species Filicum*, ii., p. 139. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Eaton*, *Ferns of North America*, ii., t. 54. *Lowe*, *Ferns British and Exotic*, iii., t. 30A.

P. (Cheiloplecton) auriculata—Cheil-op-lec′-ton ; aur-ic-ul-a′-ta (eared), *Link*.

A greenhouse species, of medium dimensions, native of Cape Colony, bearing on flaccid and slightly scaly stalks, 2in. to 3in. long and of a bright

chestnut-brown colour, its narrowly spear-shaped fronds, which are 3in. to 9in. long, 1in. to 1½in. broad, and only once divided to the midrib, bearing from twelve to eighteen pairs of slightly-stalked leaflets. The leaflets are broader in the barren than in the fertile state, and vary in shape from narrowly-oblong and entire, to auricled at one or both sides at the base, or cut down nearly to the midrib in the lower part into oblong lobes, of a soft, papery texture, and naked on both surfaces. The involucre, which is similar in colour and texture to the frond, is broad and much wrinkled.—*Hooker*, *Species Filicum*, ii., p. 140. *Hooker and Greville*, *Icones Filicum*, t. 116.

P. (Allosorus) Barklyæ—All-os-o′-rus ; Bark′-lў-æ (Lady Barkly's), *Baker*.

Probably the most vigorous of the whole genus, this stove species, native of the Seychelles, where it was found by Lady Barkly and also by Dr. Kirk, has fronds 1ft. or more in length, 9in. broad, deltoid, and quadripinnatifid (in shape of the Greek delta, Δ, and four times divided half-way to the midrib) ; they are borne on strong, upright, naked, dark brown, polished stalks 1ft. to 1½ft. long. The lowest leaflets, 6in. to 8in. long, are almost deltoid ; their pinnules (leafits) are largest on the lower side, and are furnished on each side with segments which are cut down to the rachis (stalk) into numerous narrow divisions only ¼in. long. The texture is leathery, and the rachis and both surfaces are naked. The sori (spore masses) are disposed in a continuous line along the opposite edges of the gradually-narrowing segments, so that the broad, pale brown covering, of a thin and transparent nature, usually nearly reaches the tip.—*Hooker*, *Synopsis Filicum*, p. 151.

P. (Allosorus) bella—All-os-o′-rus ; bel′-la (handsome), *Baker*.

A greenhouse species, native of California, with narrow, bipinnate fronds, 5in. to 6in. long, borne on naked, black stalks 3in. long. The leaflets, about ½in. long, egg-shaped, and stalkless, are divided into four or six narrow-oblong leafits : these are toothed, rounded at the base, of a leathery texture, dull green on both surfaces, and have their edges strongly revolute—*Hooker*, *Synopsis Filicum*, p. 477. *Nicholson*, *Dictionary of Gardening*, iii., p. 66.

P. (Allosorus) Boivini—All-os-o′-rus ; Boi-vi′-ni (Boivin's), *Hooker*.

This stove species, native of Madagascar, Mauritius, Macalisberg, Ceylon, and the Neilgherries, where it occurs at elevations varying between 3000ft.

and 5000ft., comes near the better-known *P. hastata* in size and habit; but the segments are narrower, and the involucre is formed of the slightly-incurved edge of the leafits.—*Hooker*, *Species Filicum*, ii., p. 147, t. 118A.

P. (Allosorus) brachyptera—All-os-o′-rus; brach-yp′-ter-a (shortly-winged), *Baker*.

Eaton states that this pretty, greenhouse species, of small dimensions, grows in rocky places, in the Sierra of California, at 4000ft. elevation, and that it was first collected in 1869. Its spear-shaped fronds, 4in. to 6in. long and borne on stalks of the same length, are produced from a short-creeping, knotted rootstock, which is chaffy with very narrow, rusty-brown scales toothed at their edges. They are bipinnate (twice divided to the midrib), and furnished with very short, stalkless pinnules (leafits) often broader than long, seven to nine to a leaflet, closely placed (Fig. 18), of a leathery texture, dull green in colour, pointed at the tip, and rounded at the base; their edge is so conspicuously revolute (rolled in) as to make the leafits appear almost cylindrical. The sori (spore masses), disposed near the end of the veinlets, are covered by the revolute margins of the leafits.—*Hooker*, *Synopsis Filicum*, p. 477. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Eaton*, *Ferns of North America*, ii., t. 47.



Fig. 18. Pellæa brachyptera
(¼ nat. size).

P. (Cheiloplecton) Breweri—Cheil-op-lec′-ton; Brew′-er-i (Brewer's), *Eaton*.

This is a remarkably pretty, greenhouse Fern, native of North America. Eaton states that it is common in the clefts of exposed rocks in the higher cañons of the Sierra of California, and thence eastward to the East Humboldt Mountains and the Wahsatch; it is also found near Loma, in Colorado, and

near the Rio Grande. It was first collected in 1863, by Professor Brewer, near Sonora Pass, at 7000ft. to 8000ft. elevation, and afterwards in Ebbett's Pass, at the same elevation, and in Mono Pass, at 9000ft. to 10,000ft. elevation. The delicate little fronds, 2in. to 3in. long scarcely 1in. broad, narrow-oblong, simply pinnate (once divided to the midrib), borne on tufted, round, very fragile, chestnut-brown stalks 2in. to 3in. long and chaffy only at the base, are produced from a short, stout, ascending rootstock, densely clothed with narrow, light brown scales. The leaflets are usually opposite, the upper ones egg-shaped, undivided and stalkless, the lower ones cleft down the centre nearly to the base into two unequal parts, of which the lower is the smaller, each the same shape as the upper leaflets, and not toothed or further divided, the larger part being about $\frac{1}{2}$in. long and $\frac{1}{4}$in. broad. The fronds are of a thick but scarcely leathery texture, pale green, and naked on both surfaces. The sori (spore masses), disposed in a continuous, marginal line, are covered by a broad, thin, and nearly transparent involucre.—*Hooker*, *Synopsis Filicum*, p. 145. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Eaton*, *Ferns British and Exotic*, i., t. 48.

P. (Platyloma) Bridgesii — Plat-yl-o′-ma ; Bridg-e′-sĭ-i (Bridges'), *Hooker.*

Eaton says this very pretty, greenhouse species is found growing in clefts of rocks in the Sierra of California, usually above 6000ft. elevation. It has been collected by Professor Brewer, at Ebbett's Pass, at 9000ft. elevation, in Silver Valley, in the Yosemite Valley, and in other places. Its fronds, produced from a short-creeping rootstock, densely chaffy with narrow scales, and borne on wiry, upright, naked, bright chestnut-brown stalks 2in. to 4in. long, are simply pinnate (only once divided to the midrib), 4in. to 6in. long, and 1in. or less in breadth ; they are furnished with six to eight pairs of stalkless leaflets, rounded or heart-shaped at the base, blunt at the summit, of a leathery texture, and glaucous (bluish-green) on both surfaces. The sori (spore masses), disposed in a broad, marginal line, are covered by a much-wrinkled, thin, and somewhat transparent involucre protruding beyond the edge of the frond until they arrive at full maturity.—*Hooker*, *Species Filicum*, ii., p. 238, t. 142B. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Eaton*, *Ferns of North America*, i., t. 48.

P. (Platyloma) Brownii—Plat-yl-o′-ma ; Brown′-ĭ-i (Brown's). This is synonymous with *P. paradoxa.*

P. (Holcochlæna) Burkeana—Holc-och-læ′-na ; Bur-kĕ-a′-na (Burke's), *Baker.*

A stove species, of small dimensions, native of the Cape of Good Hope, Angola, and the Mascarene and Comoro Islands. Its fronds, borne on tufted, zigzag, nearly black, polished stalks 4in. to 6in. long, seldom measure more than 4in. in length and 2in. in breadth. They are furnished in their upper part with several pairs of simple, short-stalked leaflets 1½in. long, ½in. broad, quite entire, rounded at the base, and blunt at the point ; and in their lower part with two or three pairs of slightly-divided leaflets. These leaflets are of a leathery texture and naked on both surfaces. The sori (spore masses), disposed in quite a continuous line round the margin of the leaflets, ultimately hide the reflexed involucre.—*Hooker*, *Species Filicum*, ii., p. 213, t. 126B.



Fig. 19. Frond of Pellæa calomelanos
(½ nat. size).

P. (Platyloma) calomelanos—Plat-yl-o′-ma ; cal-om-el′-an-os (beautiful-dark), *Link.*

The specific name of this beautiful, greenhouse species applies to the dark brown colour of its strong, tufted, upright, polished stalks, which are 4in. to 6in. long and slightly scaly towards the base. The fronds (Fig. 19), 4in. to 8in. long and 3in. to 6in. broad, are somewhat in shape of the Greek delta, Δ, and twice or three times divided to the midrib. The rigid, spreading leaflets are sometimes simply pinnate, but frequently are twice pinnate ; their leafits, borne on rigid, though slender, black, shining stalks, are ½in. to ¾in.

each way and vary in contour from blunt-heart-shaped to triangular-halbert-shaped, and with the two sides often unequal at the base. The texture of the fronds is leathery, and they are smooth and of a lovely glaucous (bluish-green) colour on both surfaces. The sori (spore masses), disposed in a broad line along the margin of the leafits, soon hide the narrow, thin, and transparent involucre. This species is a native of Cape Colony (where it occurs at 4000ft. elevation), Zambesi Land, Angola, and Abyssinia. It is also reported from the Himalayas at an elevation of 6000ft.—*Hooker*, *Species Filicum*, ii., p. 140. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Botanical Magazine*, t. 4769. *Lowe*, *Ferns British and Exotic*, iii., t. 26.

P. (Allosorus) consobrina — All-os-o′-rus ; con-so-bri′-na (related), *Hooker.*

A greenhouse species, of large dimensions, native of Cape Colony, Kaffraria, Natal, Abyssinia, &c. Its fronds, 6in. to 12in. long and 4in. to 9in. broad, are borne on strong, erect, naked, polished, dark brown stalks 6in. to 12in. long ; they are deltoid (in shape of the Greek delta, Δ), and three or four times divided nearly to the midrib. The lowest leaflets, also deltoid, have their pinnules (leafits) of the lower side larger than the others ; and all are usually cut down into several spear-shaped or deltoid segments of a leathery texture and naked on both surfaces. The sori (spore masses), disposed in a continuous line along the margins, are covered by a moderately broad, thin, transparent involucre, and the edge of the segments is often enrolled.—*Hooker*, *Species Filicum*, ii., p. 145, t. 117A. *Nicholson*, *Dictionary of Gardening*, iii., p. 66.

P. (Platyloma) cordata—Plat-yl-o′-ma ; cor-da′-ta (heart-shaped), *J. Smith.*

This very handsome, greenhouse species is a native of Mexico and the Andes of Peru. Its broadly spear-shaped fronds, 1ft. or more in length and 4in. to 6in. broad, are borne on strong, erect, straw-coloured stalks 6in. to 9in. long, polished, but clothed below with small, pale, spear-shaped scales when young. The leaflets, of the same shape as the fronds, are provided with a straight rachis, the lower ones being slightly branched at the base ; their short-stalked segments, oblong or egg-shaped, rounded or heart-shaped at the base, ½in. to 1in. long, and half as broad, are of a somewhat leathery texture

and blunt at the extremity. The sori (spore masses) are disposed in broad, marginal lines, which soon hide the involucre.—*Hooker*, *Species Filicum*, ii., p. 148. *Nicholson*, *Dictionary of Gardening*, iii., p. 66.

P. c. flexuosa—flex-ŭ-o′-sa (zigzag-bending), *Link*.

In gardens this variety is usually found under the name of *Platyloma flexuosa*. It is a North American plant, being found from Austin, Texas, to San Diego County, California, where, according to Eaton, it grows in exposed, rocky places ; it also occurs from Mexico to Peru. Lowe says it was raised from spores in the Royal Gardens, Kew, in 1838. The handsome fronds, produced from a rather slender rootstock clothed with narrow, brown scales, are borne on stalks several inches long, more or less furrowed along the front,



Fig. 20. Frond of Pellæa cordata flexuosa
(¼ nat. size).

gradually passing into a more or less zigzag stalk (Fig. 20). They are from 6in. to 2ft. long, broadly oblong in outline, twice, or the larger ones three times, pinnate, and furnished with usually alternate leaflets and roundish or egg-shaped, distinctly-stalked leafits that are very blunt at their extremity, of a somewhat leathery texture, smooth, and slightly glaucous beneath. The sori (spore masses) form a broad band, continuous along the margin of the fertile leafits, and are covered by a very narrow involucre. On account of its singular habit, the unusual colour of its fronds, and the broad, dark sori, *P. c. flexuosa* may be considered as one of the most distinct plants of the whole genus.—*Hooker*, *Species Filicum*, ii., p. 148. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Eaton*, *Ferns of North America*, i., t. 27. *Lowe*, *Ferns British and Exotic*, iii., t. 25.



Nephrolepis Duffii, showing Habit of Plant and Terminal Portion of detached Frond

(Habit, ⅛ nat. size; Portion of Frond, nat. size).

P. decomposita—de-com-pos′-it-a (much divided). An old name for *P. angustifolia.*

P. (Cheiloplecton) deltoidea—Cheil-op-lec′-ton ; del-toid′-ĕ-a (in shape of the Greek delta, Δ), *Baker.*

A greenhouse species, native of Cape Colony, and of little decorative value. It is only interesting inasmuch as it is probably the smallest-growing of the whole genus ; its bipinnate, deltoid fronds seldom exceeding 2in. each way, and being borne on wiry, dark chestnut stalks about 1½in. long.—*Hooker*, *Species Filicum*, ii., p. 107.

P. (Allosorus) densa—All-os-o′-rus ; den′-sa (dense), *Hooker.*

This pretty, greenhouse species, called in America the "Oregon Cliff Brake," is, according to Eaton, found growing in clefts of rocks in Oregon ; on the banks of the Rogue River ; near Fort Otford ; in the Sierra of California, where it occurs at elevations varying between 6000ft. and 8000ft. ; from the Castle Mountains to the Yosemite ; and it has been collected at Jackson's Lake in Wyoming Territory. Its finely-divided fronds, produced from a somewhat slender rootstock that is chaffy with very dark, narrow scales, are borne on densely-tufted, slender but wiry stalks 4in. to 6in. long, of a dark chestnut-brown colour, dull or moderately polished ; they are 2in. to 3in. long, 1in. to 1½in. broad, broadly oblong, and three times divided to the midrib. The leaflets and leafits, generally spear-shaped, are crowded, and are again divided into numerous stalkless, narrow segments, of a leathery texture and smooth on both surfaces, with inrolled edges, and terminating in a sharp point. The sori (spore masses) are covered by a broad, rigid involucre, rolled permanently over them.—*Hooker*, *Species Filicum*, ii., p. 150, t. 125. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Eaton*, *Ferns of North America*, i., t. 11.

P. (Platyloma) Doniana—Plat-yl-o′-ma ; Don-ĭ-a′-na (Don's), *Hooker.*

A stove species, native of the Seychelles, Angola, and Zambesi Land. It much resembles *P. paradoxa* in size and habit, and is distinguishable from that species mostly on account of the lower part of the midrib of its fronds being black and polished, as well as the rachis (stalk of the leafy portion).—*Hooker*, *Species Filicum*, ii., p. 137, t. 125.

P. (Platyloma) falcata—Plat-yl-o′-ma ; fal-ca′-ta (sickle-shaped), *Fée.*

This decorative, greenhouse species has a very extensive range of habitat, being found in Tropical Hindostan, the Malayan Peninsula, Australia, New Zealand, Tasmania, the Kermadec Islands, &c. According to Lowe, it was introduced into the Royal Gardens, Kew, by Allan Cunningham, as far back as 1823. The fronds, produced from a wide-creeping, slender, underground rhizome, and borne on strong, erect stalks 3in. to 6in. long, more or less hairy and scaly, are oblong-spear-shaped, 6in. to 18in. long, 1in. to 2in. broad, and only once divided to the midrib (Fig. 21). They are formed of twelve to thirty or more pairs of stalkless or nearly stalkless leaflets ½in. to 1in. long and ¼in. to ½in. broad, and usually a larger terminal one ; all are spear-shaped or oblong-spear-shaped, usually terminating in a sharp point, and often slightly sickle-shaped, wedge-shaped, enlarged, or heart-shaped at the base ;



Fig. 21. Frond of Pellæa falcata
(¼ nat. size).

their texture is leathery, and their colour a dark, dull green above, paler beneath. The sori (spore masses) are disposed in a continuous, broad, marginal line extending from the base to nearly the summit of each fertile leaflet, and soon hide their narrow involucre.—*Hooker*, *Species Filicum*, ii., p. 136, t. 11B. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Lowe*, *Ferns British and Exotic*, iii., t. 30B.

P. (Allosorus) flavescens—All-os-o′-rus ; fla-ves′-cens (yellowish), *Fée.*

A strong-growing, stove species, native of Rio Janeiro, where it was gathered by Bongard and by Glaziou. It has little in common with its specific name, for its oblong or broadly spear-shaped fronds, 6in. to 12in. long, dull green and naked on both surfaces, and borne on naked, black stalks 6in. to 12in. long, are produced from a short-creeping rhizome clothed with dark brown scales. They are twice or three times pinnate ; their leaflets are spear-shaped and short-stalked, the lowest, which are the longest, being again

pinnate, with two or three pairs of blunt segments, the edges of which are strongly revolute (turned back) and of a leathery texture. The sori (spore masses) are covered with a persistent involucre of a firm, crisp nature, with close indentations.—*Hooker*, *Synopsis Filicum*, p. 477.

P. (Platyloma) flexuosa—Plat-yl-o′-ma; flex-ŭ-o′-sa (zigzag-bending). A variety of *P. cordata.*

P. (Cheiloplecton) Fournieri—Cheil-op-lec′-ton; Four-nĭ-e′-ri (Fournier's), *Baker.*

This stove species, native of Mexico, is of small dimensions. Its fronds, deltoid and bipinnate (in shape of the Greek delta, Δ, and twice divided to the midrib), are about 6in. each way, and borne on short, roundish, pale-coloured stalks clothed with sharp-pointed scales of a tawny colour. The stalked leaflets are alternate, the lowest, which are also the largest, being usually 3in. long; their leafits, which are attached to the rachis by a broad base, are distant and sharp-pointed, smooth on their upper surface, and hairy on their under-side. The sori (spore masses), disposed in a continuous, marginal line, are covered by a smooth involucre of a peculiarly wrinkled nature.—*Hooker*, *Synopsis Filicum*, p. 476.

P. (Cheiloplecton) geraniæfolia—Cheil-op-lec′-ton; ger-an-ĭ-æ-fol′-ĭ-a (Geranium-leaved), *Fée.*

A greenhouse species, which, according to Kunze, was introduced into this country so far back as 1816; according to Lowe, it was cultivated in the Royal Gardens, Kew, in 1838. It has a very extensive range of habitat, being found in Tropical America, from Guatemala southward to Brazil and Peru; in Polynesia, from New Caledonia northward to the Neilgherries, North China, and Sub-tropical Australia, the Mascarene Islands, Zambesi Land, Angola, and Cape Colony. Although of small dimensions, this pretty Fern is extensively used as a decorative plant. Its fronds, in shape of the Greek delta, Δ, 2in. to 4in. each way, and borne on erect, wiry, polished stalks 6in. to 9in. long and slightly scaly towards the base, are cut down nearly to the rachis into three or four leaflets on each side, of which the lowest pair is much the largest. The leafits on the lower side are much larger than the others and are deeply lobed (see Plate), with narrow-

oblong segments. They are of a soft, papery texture and bright green colour, and their sori (spore masses), of a reddish-brown colour, are disposed in broad, continuous, marginal lines and covered by a narrow indusium.—*Hooker*, *Species Filicum*, ii., p. 132 ; *Icones Plantarum*, t. 915. *Nicholson*, *Dictionary of Gardening*, iii., p. 66. *Lowe*, *Ferns British and Exotic*, iii., t. 27.

P. (Allosorus) glauca — All-os-o′-rus ; glau′-ca (bluish-green), *J. Smith.*

A stove species, of small dimensions, native of Chili and Mexico, with fronds 3in. to 4in. each way, deltoid and quadripinnatifid (in form of the Greek delta, Δ, and four times divided nearly to the midrib), borne on strong, erect, polished stalks 4in. to 8in. long and of a dark chestnut-brown colour. The lowest leaflets are much the largest, and the leafits on the lower side are also larger than the others ; all the leafits are cut down to the rachis into segments, and these are again cut down to the rachis below, the ultimate divisions being about $\frac{1}{8}$in. long, narrow-oblong, with inrolled edges more or less notched. The fronds are of a leathery texture, naked on the upper surface, and woolly underneath ; the leathery involucre is rolled down over the spore masses.—*Hooker*, *Species Filicum*, ii., p. 153.

P. Glaziovii—Glaz-ĭ-o′-vĭ-i (Glaziou's). Synonymous with *P. microphylla.*

P. (Cheiloplecton) gracilis — Cheil-op-lec′-ton ; grac′-il-is (slender), *Hooker.*

Although found also in Siberia, Thibet, and Northern India, where it is said to occur at 9000ft. to 10,000ft. elevation, this pretty, delicate, greenhouse species is a thorough North American Fern. Eaton states that it is found growing in crevices of damp and shaded, calcareous rocks, especially in deep glens from Labrador to British Columbia, and southward to Iowa, Wisconsin, and Pennsylvania ; also in Colorado, near Breckinridge City ; and adds that, though by no means a common plant, it is found in Sunderland, Massachusetts ; at Trenton Falls, Chittenango Falls, and other deep glens in Central New York ; in Lycoming and Sullivan Counties, Pennsylvania ; and in other similar places in Vermont, Michigan, &c. The plant, which Eaton says is the most delicate of all the North American Pellæas, has somewhat the general appearance of *Cryptogramme crispa*, and is also known in gardens as *P. Stelleri.*

Its fertile and barren fronds, which are quite distinct in appearance, and borne on slender, straw-coloured, polished stalks 2in. to 3in. long, are produced from a very slender rootstock, scarcely more than $\frac{1}{24}$in. in thickness and sometimes 2in. to 3in. long, and so hidden in the crevices of the rocks that it is seldom secured by collectors. Both kinds of fronds are of a thin, papery texture and pinnate, with the lower leaflets sometimes again slightly divided. In the barren fronds, which are shortest, being seldom more than 3in. long and 1½in. broad, the segments of the leaflets, plainly attached to the secondary midrib, are roundish in shape and more or less lobed and toothed on their margins; in the fertile fronds, which are taller than the barren ones, the segments are more distinct, longer, and narrower. The terminal leaflet of the fronds and the terminal segment of the leaflets are considerably longer than the others. The sori (spore masses) are covered by a broad, continuous involucre of a softer nature even than the frond itself.—*Hooker*, *Species Filicum*, ii., p. 138, t. 133B. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Eaton*, *Ferns of North America*, ii., t. 54.

P. (Allosorus) Greggii—All-os-o′-rus; Greg′-gĭ-i (Dr. Gregg's), *Mettenius*.

A greenhouse species, of small dimensions, native of Mexico, with broadly egg-shaped fronds 2in. to 3in. long, produced from a short-creeping rhizome densely clothed with black-brown, toothed scales, and borne on reddish, opaque stalks 1in. to 3in. long and slightly scaly. These fronds are twice or three times divided to the midrib and furnished with short-stalked leaflets and stalkless leafits narrowed at the base and of a leathery texture; their stalkless ultimate segments are oblong and blunt, and have revolute edges, under which the sori (spore masses) are completely hidden.—*Hooker*, *Synopsis Filicum*, p. 477.

P. (Platyloma) hastata—Plat-yl-o′-ma; has-ta′-ta (halbert-shaped), *Link*.

This highly decorative, strong-growing, greenhouse Fern, more generally found in gardens under the name of *Pteris hastata*, and said by Lowe to have been introduced into England before the year 1822, has a somewhat extensive range of habitat, being found from Cape Colony northward to Natal, Zambesi Land, the Mascarene and the Cape de Verde Islands, and Abyssinia. The fronds, 1ft. to 2ft. long, are borne on wiry, erect, dark chestnut-brown, highly-polished

stalks 6in. to 12in. long; they are oblong in shape and bi- or tripinnate (twice or three times divided to the midrib), their leaflets varying from simply pinnate to copiously bipinnate. The leafits, of a soft, papery texture and yellowish-green colour, are egg-shaped when barren, except the terminal ones, which usually are distinctly halbert-shaped and undulated on their margins: these characters are much more conspicuous when the plant is fertile (Fig. 22 shows barren fronds only). The fronds are smooth on both surfaces, and the sori (spore masses), disposed in a continuous, marginal line, are provided with a somewhat narrow, thin involucre, nearly or quite hidden when the spores are ripe.—*Hooker*, *Species Filicum*, ii., p. 145; *Filices Exoticæ*, t. 50. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Lowe*, *Ferns British and Exotic*, iii., t. 32.



Fig. 22. Pellæa hastata
(much reduced).

P. (Allosorus) intramarginalis — All-os-o′-rus; in-tra-mar-gin-a′-lis (within the margin), *J. Smith.*

A delicate-looking, greenhouse species, native of Mexico and Guatemala, with broadly spear-shaped fronds, 6in. to 12in. long, 2in. to 4in. broad, twice divided nearly to the midrib, and borne on tufted, upright, dark chestnut-brown, polished stalks 3in. to 6in. long. The spear-shaped leaflets (Fig. 23), 2in. to 3in. long, 1in. broad, and opposite, are cut down nearly to the rachis into long, narrow-oblong leafits, of a somewhat leathery texture, pale or glaucous green in colour, and smooth on both surfaces. The abundant and conspicuous sori (spore masses) are disposed in a continuous, single, intramarginal row, and covered by a broad, somewhat fringed, thin and transparent involucre.—*Hooker*, *Species Filicum*, ii., p. 112. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Lowe*, *Ferns British and Exotic*, iii., t. 31.

P. i. serratifolia—ser-ra-tif-ol′-ĭ-a (having saw-edged leaves), *Hooker*.

In this variety, which is also known under the name of *Pteris fallax*, and which partakes of the same habit and dimensions as the species, the pinnules (leafits) are distinctly toothed.—*Hooker*, *Second Century of Ferns*, t. 72. *Nicholson*, *Dictionary of Gardening*, iii., p. 67.

P. (Allosorus) involuta—All-os-o′-rus ; in-vol-u′-ta (wrapped up, rolled inward), *Baker*.

This greenhouse species, of small dimensions, is a native of Zanzibar and Cape Colony. Its oblong-spear-shaped fronds, 3in. to 4in. long, 1in. to 1½in. broad, and three times divided nearly to the midrib, are borne on tufted, wiry, erect, blackish stalks 2in. to 3in. long and more or less scaly throughout. The lower leaflets are opposite, broadly triangular, and cut down into several broadly-triangular leafits, the upper of which are divided into three lobes, while the lower are cut down to the rachis below. The fronds are of a leathery texture, pale green and smooth on both surfaces, and the sori (spore masses), disposed in a continuous, marginal line, are covered by a distinct, pale, thin, transparent involucre.—*Hooker*, *Species Filicum*, ii., p. 108. *Nicholson*, *Dictionary of Gardening*, iii., p. 67.



Fig. 23. Leaflet of Pellæa intramarginalis (nat. size).

P. (Allosorus) longimucronata—All-os-o′-rus ; long-im-u-cro-na′-ta (long-pointed). This is synonymous with *P. mucronata*.

P. (Allosorus) marginata — All-os-o′-rus ; mar-gin-a′-ta (edged), *Baker*.

A stove species, of medium size, native of Tropical America, from Mexico and Jamaica southward to Peru and the Argentine Territory. Its somewhat triangular fronds, 4in. to 8in. long, 3in. to 6in. broad, borne on strong, erect, polished stalks 3in. to 9in. long, of a chestnut-brown colour, and slightly scaly towards the base, are three or four times divided nearly to the midrib ; the

lower leaflets are usually much the largest, and the leafits on the lower are larger than those on the upper side. They are of a somewhat leathery texture, smooth on both surfaces, and the narrow-oblong ultimate divisions have their edges rolled in, thus hiding the spore masses, which are disposed in an uninterrupted line along the margin.—*Hooker*, *Species Filicum*, ii., p. 105.

P. (Cheiloplecton) microphylla — Cheil-op-lec′-ton ; mi-croph-yl′-la (small-leaved), *Fée*.

This small, stove species, native of Rio Janeiro, and also known as *P. Glaziovii*, is of little decorative value. Its roundish fronds, seldom more than ½in. long and borne on stalks ½in. to 1½in. long, are composed of five blunt lobes, the central the longest, all of a somewhat leathery texture and dull green colour.—*Hooker*, *Synopsis Filicum*, p. 476.

P. (Allosorus) mucronata—All-os-o′-rus ; mu-cro-na′-ta (sharply-pointed), *Eaton*.

This very pretty, greenhouse species, of medium size, also known under the names of *P. longimucronata* and *P. Wrightiana*, is a native of Western Texas, Colorado, New Mexico, and Arizona ; it is also reported from Bolivia, but Eaton, who, in his excellent work on "Ferns of North America," says that it occurs mostly in exposed, rocky places, also states (ii., p. 6) that it is "attributed also to California in 'Synopsis Filicum,' but probably through some error, as I have seen no true *Wrightiana* from that state." Its interesting fronds, deltoid and bipinnate (in shape of the Greek delta, Δ, and twice divided to the midrib), 3in. to 6in. long and 1in. to 3in. broad, are produced from a short, thick, knotted rootstock that is densely chaffy with very narrow scales of a dark brown colour, and are borne on strong, erect, dark brown, polished stalks 2in. to 4in. long. The leaflets of the barren fronds are almost stalkless, roundish or egg-shaped, rounded or even somewhat heart-shaped at the base, but provided with a minute, semi-transparent, sharp point, or mucro, at their extremity. Those of the fertile fronds are rolled in nearly to the midveins and therefore very narrow, often longer than the barren ones, curved upwards, and terminate in a sharp, mucronate point. All are of a leathery texture and of a pale glaucous-green colour on both surfaces. The sori (spore masses) are completely hidden by the broad, leathery involucre, which is permanently

rolled over them.—*Hooker*, *Species Filicum*, ii., p. 142, t. 115B. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Eaton*, *Ferns of North America*, ii., t. 47.

P. (Platyloma) nitida—Plat-yl-o′-ma ; nit′-id-a (bright), *Baker*.

A greenhouse species, of medium dimensions, native of Tropical Australia, with fronds in shape of the Greek delta, Δ, twice or three times divided to the midrib, 4in. to 6in. each way, and borne on tufted, slender, chestnut-coloured stalks 6in. to 9in. long. The upper leaflets are simple (undivided); the lowest, much the largest, are stalked and furnished with a few distant, strap-shaped leafits of thin but firm texture, greyish-green on both surfaces, and having spore masses provided with a very narrow involucre.—*Hooker*, *Synopsis Filicum*, p. 478.

P. (Allosorus) nitidula—All-os-o′-rus ; nit-id′-ul-a (somewhat bright), *Baker*.

This pretty little, greenhouse species is only known to come from the Himalayas, where it is said to grow at an elevation of 6000ft. Its finely-cut fronds, 3in. to 4in. long, 1in. to 1½in. broad, and twice or three times cut down nearly to the midrib, are borne on densely-tufted, slender stalks 3in. to 6in. long, of a dark brown colour and polished except at their base, which is slightly scaly. The leaflets are opposite ; the lower ones, in the shape of the Greek delta, Δ, are cut down to the rachis into a few leafits. The upper leafits are narrow-oblong and entire ; the lower ones are again pinnatifid. The abundant sori (spore masses) form a continuous, marginal line, and are covered by a thin, broad, toothed involucre. *Cheilanthes nitidula* is identical with this species.—*Hooker*, *Species Filicum*, ii., p. 113 ; *Icones Plantarum*, t. 912.

P. (Allosorus) ornithopus — All-os-o′-rus ; or-ni′-thop-us (Bird's-foot Cliff Brake), *Hooker*.

This is an exceedingly pretty, greenhouse species, native of California, where it is found growing commonly on dry rocks from Mendocino County to San Diego ; also on Guadalupe Island. Professor Brewer says : "This species is abundant on the very dry mountains in the Western part of the State ; it grows often in tufts in the rocks, where it receives no moisture

whatever for several months in summer, and is exposed to an intensely scorching sun" (Eaton, "Ferns of North America," ii., p. 12). Its triangular fronds, 4in. to 6in. long, 2in. to 3in. broad, and twice divided nearly to the midrib, are produced from a short, thick, knotted rootstock, densely chaffy with very narrow, dark brown scales, and are borne on stiff, erect, dark chestnut-brown, polished stalks 3in. to 6in. long. The rigid, spreading leaflets are furnished with distantly-placed, stalkless leafits on each side, which are cut at the base into three narrow, mucronate (sharply-pointed) segments, of which the central one is the largest. In very large plants, some of the leaflets are more or less elongated and have from five to seven pairs of leafits. The fronds are of a leathery texture, very pale glaucous-green and naked on both surfaces, and the sori (spore masses) are quite hidden by the broad, toothed, leathery involucre, which is rolled permanently over them.—*Hooker*, *Species Filicum*, ii., p. 144, t. 116A. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Eaton*, *Ferns of North America*, ii., t. 47.

P. (Platyloma) pallida—Plat-yl-o′-ma ; pal′-lid-a (pale), *Baker*.

A greenhouse species, native of Mexico, with oblong-spear-shaped fronds 9in. to 10in. long, 2in. to 2½in. broad, twice cut to the midrib, and borne on grey-brown stalks 3in. to 4in. long, clothed with minute, rough, narrow, brown scales. The short-stalked leaflets are distantly placed, and are furnished with oblong, blunt, slightly-lobed leafits ; they are of a leathery texture, of a pale greyish-green colour on their upper surface, and thinly hairy underneath. The sori (spore masses) are furnished with a narrow involucre, which is soon hidden.—*Hooker*, *Synopsis Filicum*, p. 478.

P. (Platyloma) paradoxa — Plat-yl-o′-ma ; par-ad-ox′-a (paradoxical), *Hooker*.

This handsome, greenhouse species, of medium size, native of Queensland and New South Wales, is said by Lowe to have been introduced into England in 1821. It is frequently found in gardens under the name of *P. Brownii*. The oblong fronds, 6in. to 9in. long, 4in. to 6in. broad, and only once divided to the midrib, are borne on strong, upright stalks 6in. to 9in. long, of a dark brown colour, and slightly woolly. The short-stalked leaflets, four to six to a frond, have a considerable space between them ; they are 1½in. to 2in. long,

½in. to 1in. broad, spear-shaped, entire, bluntish at the apex, and heart-shaped or roundish at the base. The fronds are of a leathery texture and naked on both surfaces, but the rachis is slightly woolly. The spore masses, disposed in a marginal line, soon hide the involucre. — *Hooker*, *Species Filicum*, ii., p. 135, t. 111A ; *Filices Exoticæ*, t. 21. *Nicholson*, *Dictionary of Gardening*, iii., p. 67.

P. (Cheiloplecton) Pearcei — Cheil-op-lec′-ton ; Pear′-ce-i (Pearce's), *Baker.*

A greenhouse species, native of the Andes of Peru, where it occurs at 6000ft. elevation. It is closely allied to *P. Breweri*, but has leaflets more compound, and stalks devoid of scales at the base.—*Hooker*, *Synopsis Filicum*, p. 476.

P. (Allosorus) pectiniformis—All-os-o′-rus ; pec-tin-if-or′-mis (comb-shaped), *Baker.*

This is a robust, free-growing, stove species, native of Natal, Angola, and the Mascarene Islands. Its spear-shaped fronds, 6in. to 12in. long, 2in. to 3in. broad, and produced from a stout, short-creeping rhizome, are borne on round, black stalks 2in. to 6in. long and slightly scaly at the base. These fronds are simply pinnate (only once divided to the midrib), being furnished with narrow, strap-shaped, entire leaflets with revolute margins, blunt at the apex, and heart-shaped at the base. They are of a rigidly leathery texture, green and smooth on both surfaces, and their spore masses are provided with a smooth, pale, firm involucre.—*Hooker*, *Synopsis Filicum*, p. 147.

P. (Cheiloplecton) pilosa—Cheil-op-lec′-ton ; pil-o′-sa (hairy), *Hooker.*

This stove species, native of Bourbon, is a plant of very distinct appearance. Its barren and fertile fronds, borne on strong, wiry, brownish-black stalks 6in. to 9in. long and more or less clothed with small, narrow scales throughout, are totally different. The barren ones, in form of the Greek delta, Δ, and 1½in. each way, are cut down to within ¼in. of the rachis ; their lowest leaflets, much the largest, are deeply lobed, with the lobes again notched on the under-side ; their lower surface is densely hairy, and their midrib scaly like the stalks. The fertile fronds are larger, and are cut down quite to the rachis, with narrower, longer, and more deeply-divided leaflets ;

they are of a somewhat leathery texture, and their sori (spore masses) are covered by an incurved involucre of a thin, transparent nature.—*Hooker*, *Species Filicum*, ii., p. 132, t. 114B.

P. (Allosorus) pulchella—All-os-o′-rus ; pul-chel′-la (pretty), *Fée*.

A remarkably pretty, greenhouse species, found in Western Texas, in New Mexico, and from Mexico to Peru. Regarding its habitat, Eaton, in his exhaustive work on "Ferns of North America" (i., p. 81), says : "It probably grows in clefts of exposed rocks, but none of the collectors seems to have made a note of the kind of place where it is found." Its very elegant, oblong fronds, 3in. to 6in. long, 1in. to 3in. broad, and tripinnate (three times divided to the midrib), are produced from a very short, rather stout rootstock, nearly erect, and borne on densely-tufted, wiry, erect stalks 2in. to 3in. long, of a dark chestnut-brown colour and polished nature, except at the base, where they are chaffy with narrow, crisped, nearly black scales. The lower leaflets are broadly triangular, and their spear-shaped pinnules (leafits) are again divided into oblong, blunt segments scarcely more than $\frac{1}{8}$in. long and half as broad. The fronds are of a leathery texture, pale green and smooth on both surfaces, with the edges of the fertile segments much enrolled, and a broad involucre of a thin, papery texture, permanently rolled over the spore masses. —*Hooker*, *Species Filicum*, ii., p. 150. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Eaton*, *Ferns of North America*, i., t. 11.

P. (Cheiloplecton) rigida—Cheil-op-lec′-ton ; rig′-id-a (stiff), *Hooker*.

This stove species, of medium dimensions and upright habit, is a native of Mexico, Guatemala, and Peru. Its fronds, in the shape of the Greek delta, Δ, and twice or three times divided to the midrib, are 4in. to 9in. long, 3in. to 6in. broad, and borne on stout, erect, naked or slightly scaly, dark chestnut-brown stalks 4in. to 6in. long. The lowest leaflets, which are the largest, are 3in. to 4in. long, upright, and broadly triangular ; the leafits on their lower side are larger than the others and divided again into narrow-oblong, blunt segments of a somewhat leathery texture and either naked or sometimes slightly hairy on both surfaces. The sori (spore masses), disposed in a continuous, marginal line, are covered by a broad, pale, wrinkled involucre, which is rolled down tightly over them.—*Hooker*, *Species Filicum*, ii., p. 144.

P. (Allosorus) robusta—All-os-o′-rus ; ro-bus′-ta (strong), *Hooker.*

In the case of this greenhouse species, native of Namaqua Land, South Africa, it is difficult to see the meaning of the specific name, as the whole plant does not exceed at most 5in. in height, and it is of the same delicate texture as *P. densa ;* in size and habit it much resembles the common "Parsley Fern" (*Cryptogramme crispa*), from which it differs principally in having its barren and fertile fronds similar and the segments smaller (not exceeding $\frac{1}{8}$in. in length and $\frac{1}{24}$in. in breadth), more crowded, and of a darker green colour. The involucre (covering of the sori) is similar in substance to the frond, and is rolled over the fruit till full maturity.—*Hooker*, *Species Filicum*, ii., p. 147.

P. (Platyloma) rotundifolia — Plat-yl-o′-ma ; rot-un-dif-ol′-ĭ-a (round-leaved), *Hooker.*

A very useful and pretty, greenhouse species, of drooping habit, native of New Zealand and Norfolk Island, and, according to Lowe, introduced into the Royal Gardens, Kew, in 1841. The fronds are produced from a stout, scaly,



Fig. 24. Frond of Pellæa rotundifolia
(½ nat. size).

underground-creeping rhizome, and are borne on wiry stalks more or less hairy, 6in. to 12in. long, and clothed throughout with narrow, chaffy, light brown scales. They are narrow, simply pinnate (only once divided to the midrib), 6in. to 12in. long, 1in. to 1½in. broad, and furnished with numerous short-stalked, oblong or roundish leaflets, blunt (Fig. 24) or sometimes provided with a sharp point, or mucro, at their summit. The fronds are of a leathery texture, of a particularly dark green colour and glossy nature, though the rachis (stalk of the leafy portion) is conspicuously hairy. The sori (spore masses) are disposed in a continuous, broad, marginal line, and eventually hide the very narrow involucre.—*Hooker*, *Species Filicum*, ii., p. 136 ; *Filices Exoticæ*, t. 48. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Lowe*, *Ferns British and Exotic*, iii., t. 24A.

P. (Platyloma) sagittata — Plat-yl-o′-ma ; sag-it-ta′-ta (arrow-shaped), *Moore and Houlston.*

This greenhouse species, of erect habit and of a somewhat deciduous nature, is the *Pteris sagittata* of Cavanilles, and the *Allosorus sagittatus* of Presl. It is a native of Mexico, and is closely allied to *P. cordata*, and nearer still to the variety *flexuosa*, but its fronds are not zigzag, and the habit, instead of being drooping, is upright. Lowe states that *P. sagittata* was raised from spores at the Royal Gardens, Kew, in the year 1842. Its fronds, triangular and bipinnate (twice divided to the midrib), are produced from a short-creeping rhizome, and borne on pale brown or straw-coloured stalks 8in. to 12in. long. They are 1½ft. to 2ft. long, and their stalked pinnules (leafits), smooth and of a glaucous (bluish-green) colour and soft, papery texture, have the singular property of rolling their margins under, and thus becoming quite arrow-shaped when fertile (Fig. 25) ; in the barren state these leaflets are heart-shaped.—*Lowe*, *Ferns British and Exotic*, iii., t. 28. *Hooker*, *Synopsis Filicum*, p. 153, as a variety of *P. cordata.*



Fig. 25. Portion of Fertile Frond of Pellæa sagittata (nat. size).

P. (Cheiloplecton) Seemanni—Cheil-op-lec′-ton ; See-man′-ni (Dr. Seemann's), *Hooker.*

A greenhouse species, native of Mazatlan, Mexico. It is very like *P. auriculata* in habit and general appearance, differing from that species principally in its finer venation and narrower involucre.—*Hooker*, *Species Filicum*, ii., p. 141, t. 117B.

P. (Cheiloplecton) Skinneri—Cheil-op-lec′-ton ; Skin′-ner-i (Skinner's), *Hooker.*

This stove species, native of Guatemala, is of medium size, its broadly-triangular fronds, 6in. to 12in. long, 4in. to 8in. broad, and three times cut down nearly to the midrib, being borne on stout, erect stalks 6in. to 9in. long, pale brown or straw-coloured, and slightly hairy. The lowest leafits, 1in. to 2in. long and 1in. broad, are cut down nearly to the rachis into

oblong, sharp-pointed lobes. The fronds are of a thin but firm texture, smooth on both surfaces, and the sori (spore masses), disposed in a continuous, marginal line, are provided with a narrow, thin, transparent involucre.—*Hooker*, *Species Filicum*, ii., p. 141, t. 118B.

P. (Cheiloplecton) Stelleri—Cheil-op-lec′-ton ; Stel-le′-ri (Steller's). A synonym of *P. gracilis.*

P. (Cheiloplecton) Tamburii—Cheil-op-lec′-ton ; Tam-bur′-ĭ-i (from Tambur), *Hooker.*

A very distinct, greenhouse species, of medium size, native of Tambur Valley, East Nepaul, where it was gathered by Dr. Hooker. Its singular fronds, in shape of the Greek delta, Δ, and about 6in. each way, are borne on erect, polished, bright chestnut-brown stalks 6in. to 9in. long. They are composed of three principal leaflets, the terminal one being cut down nearly to the rachis into several broad, spear-shaped lobes, of which the upper ones are entire and the lower ones larger and waved ; the lateral leaflets have the lobes on the upper side nearly entire, but those on the lower side are prolonged and again deeply lobed, the largest divisions being about 1in. deep and ½in. broad at the base. All are of a somewhat leathery texture, their under-surface is thinly coated with white meal, and their involucre, of a brownish colour, is continuous, but regularly notched, along the outer edge. —*Hooker*, *Species Filicum*, ii., p. 134, t. 129A.

P. (Allosorus) ternifolia—All-os-o′-rus ; ter-nif-ol′-ĭ-a (ternate-leaved), *Fée.*

This stove species, which is as pretty as it is interesting, and which belongs to the same group as *P. brachyptera*, *P. mucronata*, and *P. ornithopus*, is a native of Tropical America, being found principally in the Andes, from Texas southward to Peru and Chili. Eaton says of it : " A common Mexican species, found as far south as Peru, and reappearing in the Hawaiian Islands ; also collected near the head-waters of the Rio Colorado of Texas." Lowe states that it was received at the Royal Gardens, Kew, from Mr. D. Cameron, in the year 1841. The very elegant, pendulous fronds, 6in. to 12in. long, 1in. to 1½in. broad, and borne on tufted, erect, dark chestnut-brown stalks 2in. to

4in. long, polished above, but densely scaly at the base, are narrow-spear-shaped, and furnished with six to twelve or more pairs of leaflets. These are always opposite, of a leathery texture, and beautiful glaucous-green in colour on each side ; they are cleft down nearly to the base into three narrow, rigid segments, with inrolled edges, thus forming a sort of claw. The involucre (covering of the spore masses) is formed out of the edge of the frond, and



Fig. 26. Pellæa ternifolia
(¼ nat. size).

remains rolled over the spores till they attain their full maturity. For Fig. 26 we are indebted to Messrs. W. and J. Birkenhead.—*Hooker*, *Species Filicum*, ii., p. 142 ; *Filices Exoticæ*, t. 15. *Nicholson*, *Dictionary of Gardening*, iii., p. 67. *Eaton*, *Ferns of North America*, ii., t. 54. *Lowe*, *Ferns British and Exotic*, iii., t. 24B.

P. (Allosorus) Wrightiana—All-os-o′-rus ; Wright-ĭ-a′-na (Wright's). Synonymous with *P. mucronata.*

P. (Platyloma) Zippellii—Plat-yl-o′-ma ; Zip-pel′-lĭ-i (Zippelius'), *Baker.* A very distinct, stove species, of large dimensions, native of New Guinea, with fronds 1½ft. long, 2½in. broad, and borne on short, tufted stalks of

a scaly nature. These fronds are simply pinnate (only once divided to the midrib), with fifty to sixty pairs of opposite, short-stalked, narrow-spear-shaped, blunt, straight or slightly sickle-shaped leaflets, the central ones being 1in. to 1¼in. long and the lower ones much reduced ; all are of a somewhat rigid, leathery texture, with their upper surface naked, while the lower is scaly on the midribs. The sori, less conspicuous than in most species, are provided with a very narrow involucre, which is soon hidden.—*Hooker*, *Synopsis Filicum*, p. 477.

PERANEMA—Pe-ran-e′-ma. *See* **Sphæropteris.**

PHEGOPTERIS—Phe-gop′-ter-is. *See* **Polypodium.**

PHLEBIOPHYLLUM—Phleb-ĭ-oph-yl′-lum. *See* **Trichomanes.**

PHLEBODIUM—Phleb-o′-dĭ-um. *See* **Polypodium.**

PHOTINOPTERIS—Pho-ti-nop′-ter-is. *See* **Acrostichum.**

PHYMATODES—Phy-mat-o′-dēs. *See* **Polypodium.**

PHYSAPTERIS—Phy-sap′-ter-is. *See* **Cheilanthes.**

PHYSEMATIUM—Phy-se-mat′-ĭ-um. *See* **Woodsia.**

PLAGIOGYRIA—Plag-ĭ-og-y′-rĭ-a. *See* **Lomaria.**

CHAPTER VIII.

PLATYCERIUM, *Desvaux.*

(Plat-yc-er′-ĭ-um.)

Elk's-horn and Stag's-horn Ferns.

THE name *Platycerium* is derived from *platys*, broad, and *keras*, a horn, on account of the fertile fronds of these plants being divided into broad segments like stags' horns. They are, with the Acrostichums, the only Ferns comprised in the tribe *Acrosticheæ*, and form, in Hooker and Baker's "Synopsis Filicum," Genus 61, thus occupying an intermediate position between the Acrostichums and the Osmundas. *Platycerium* is a small group of plants (about half-a-dozen species) of widely-separated habitats, some being found in Temperate Australia, others in the Philippine and Malayan Islands, and one at least in Africa. The genus is well marked, and is rendered very distinct through the repeatedly-forked character of the fertile fronds of most of the species. Besides the unique mode of growth of these Ferns, their distinguishing character resides in the disposition of the sori (spore masses), which form large patches on the lower surface of the fertile fronds, and are in most cases situated at their extremity, which they cover to the length of sometimes quite eight inches: there are, however, one or two exceptional instances in which the sori occupy only the disk or broader portion. The fertile fronds are in all cases, as regards shape, size, and texture, thoroughly different from the barren ones, which are of a peculiar rounded shape, convex, and of a more or less thick, parchment-like texture. There are no British representatives of the genus.

Culture.

With the exception of *P. alcicorne*, which thrives best in an ordinary greenhouse temperature, all the Platyceriums require stove treatment. They succeed best and become most effective when planted in the fork of an ordinary tree-branch or in an artificial wall-pocket made of virgin cork. *P. alcicorne* also has a most pleasing appearance when grown as a basket plant, as its roots, which usually produce young plants on their surface, soon make a perfect ball, imparting a singular effect, growing as it does in all directions—sideways, head downwards, &c.—with equal vigour. The compost which suits them best is a mixture, in about equal parts, of rough, fibrous peat and sphagnum. The plants are particularly fond of strong light, and should receive water at the roots with moderation. The best way to keep them in good condition in that respect is to soak them thoroughly, and then to wait until the foliage begins to droop and to present a soft, withered aspect before soaking them again.



Fig. 27. Upper Portion of Fertile Frond of Platycerium æthiopicum (½ nat. size).

Platyceriums are usually propagated by means of young plants produced from the adventitious buds on their roots. *P. grande*, however, has never been known to produce any, and consequently it must be propagated by means of spores; this method, though somewhat slow, is also resorted to for other species when required in great quantities.

Principal Species and Varieties.

P. æthiopicum—æth-ĭ-op′-ic-um (African), *Hooker*.

This plant, better known in gardens under the name of *P. Stemmaria*, is the least-divided of all the species at present known. It is a native of the

Guinea Coast and Angola, Western Africa, and, though stated to have been brought to Europe as far back as 1822, it was, according to Lowe, not introduced into the Royal Gardens, Kew, until 1848. Though less known than *P. alcicorne* in collections, yet it is a very curious and handsome Fern. The barren fronds, stalkless, rounded, convex, and downy when young, have their edge more or less cleft into spreading lobes. The fertile fronds, which are 2ft. to 3ft. long and clustered, are of a pendent habit and twice divided; their disk and first division are broader than in most other kinds, the patch of fructification surrounding the sinus (depression) between the two horn-like projections, and passing into the fork so as to be shaped like the letter V (Fig. 27). The under-surface of the fertile fronds is covered with a thin, white, cottony down.—*Hooker*, *Species Filicum*, v., p. 283; *Garden Ferns*, t. 9. *Nicholson*, *Dictionary of Gardening*, iii., p. 157. *Lowe*, *Ferns British and Exotic*, vii., t. 62.

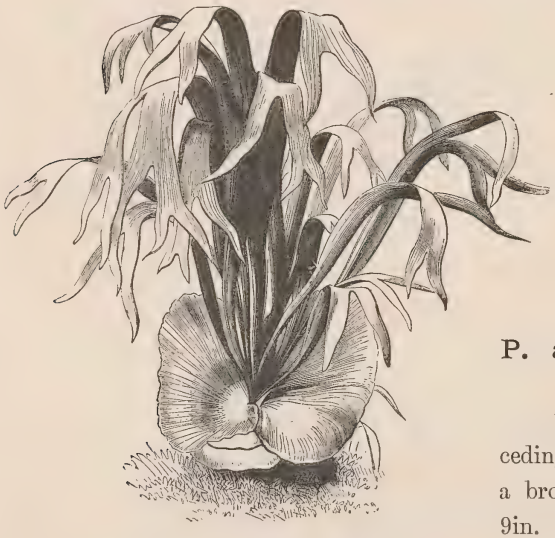


Fig. 28. Platycerium alcicorne (much reduced).

P. æ. angolense—an-go-len′-sĕ (native of Angola), *Welwitsch.*

This form differs from the preceding species principally in having a broadly wedge-shaped fertile frond, 9in. broad at the top, without either forks or horns, and with the fructification disposed in a patch nearly as broad as the lamina (limb) of the frond.—*Hooker*, *Synopsis Filicum*, p. 425. *Nicholson*, *Dictionary of Gardening*, iii., p. 157.

P. alcicorne—al-cic-orn′-ĕ (Elk's-horn), *Desvaux.*

Although the commonest species of the genus, this is an extremely interesting Fern, found growing on branches of trees in Australia, Java, the East Indies, Madagascar, and Peru. It is of easy culture, thriving equally

well in the greenhouse, the cool conservatory, or the stove. Of all known Platyceriums it is the one which grows the quickest and which is the most easily propagated from the young plants produced on its roots. According to Lowe, this useful plant was introduced by Mr. Caley into the Royal Gardens, Kew, in 1808. Its barren fronds are rounded and convex, with edges waved and lobes spreading, and are downy when young. The fertile fronds are 2ft. to 3ft. long, clustered, of somewhat upright habit, twice or three times forked (Fig. 28), and of a thick, leathery texture; their strap-shaped and bluntish ultimate divisions have the fructification disposed in the last forks and at their base in very irregular patches, and the under-surface is covered with a thin, cottony down.—*Hooker*, *Species Filicum*, v., p. 282. *Nicholson*, *Dictionary of Gardening*, iii., p. 157. *Lowe*, *Ferns British and Exotic*, vii., t. 63.

P. a. majus—ma′-jus (larger), *Moore.*

In this variety, which is a native of Australia and requires a warmer temperature than the species, the foliage is much larger and the entire plant shows a much more robust habit. Its broadly-lobed fertile fronds, borne on stiff, flat stalks, are seldom divided more than once, the limb being elegantly drooping, though the frond as a whole is erect. The barren fronds are roundish, convex, and overlap each other. For Fig. 29 we are indebted to Messrs. James Veitch and Sons.—*Nicholson*, *Dictionary of Gardening*, iii., p. 157.

P. biforme—bif-or′-mĕ (of two forms), *Blume.*

This stove species, native of Burmah, Singapore, the Malayan Peninsula and Islands, Java, Borneo, the Philippines, &c., is the only species possessing a distinct uniformly fertile segment, and this in some specimens is nearly 1ft. broad. Its barren fronds, which overlap each other, are upright and very thick, especially towards the base, and their edge is so deeply cleft that while they cannot be said to be properly lobed, they are certainly more than sinuated (notched). The fertile fronds, 6ft. to 15ft. long and of an essentially drooping character, are formed of narrow, strap-shaped, barren divisions, and of fertile ones, which are distinctly either spoon-shaped or kidney-shaped, shortly stalked, 6in. to 8in. broad, and entirely covered with fructification,

their edges being entire and rounded. *P. biforme* is stated by Nicholson to have been introduced into this country in 1842.—*Hooker*, *Species Filicum*, v., p. 285. *Nicholson*, *Dictionary of Gardening*, iii., p. 157. *Beddome*, *Ferns of British India*, t. 224.



Fig. 29. Platycerium alcicorne majus
(¼ nat. size).

P. grande—gran′-dĕ (large), *J. Smith.*

A magnificent, stove species, which is stated to have been discovered in 1828, and which, according to Lowe, was introduced into the Royal Gardens, Kew, by Mr. Bidwill, in 1842 ; it is a native of North Australia, Singapore, and the Philippine Islands. The barren fronds, which are very large, stalkless, nearly round, and ascending, have their upper portion divided into a number

of broad, blunt segments (Fig. 30) of a spongy texture and pale green colour, covered whe nyoung with a light, woolly substance, which gradually disappears as the frond becomes mature. The fertile fronds, 4ft. to 6ft. long and of a pendulous nature, are usually produced in pairs and provided with a broadly wedge-shaped disk: this becomes completely covered with the fructification, which forms a large, triangular patch, and it bears at each corner a repeatedly-forked division extending a good distance beyond it, but always remaining barren.—*Hooker*, *Species Filicum*, v., p. 284; *Filices Exoticæ*, t. 86. *Beddome*, *Ferns of British India*, t. 326. *Nicholson*, *Dictionary of Gardening*, iii., p. 157. *Lowe*, *Ferns British and Exotic*, vii., t. 64.



Fig. 30. Platycerium grande (much reduced).

P. Hillii—Hil-lĭ-i (Hill's), *Moore.*

This very handsome Fern, native of Queensland, where it was discovered in 1878, is very closely related to *P. alcicorne majus*—so much so that, until the plants attain their full development, it is very difficult to distinguish one from the other. *P. Hillii* has been exhaustively described by the late Thomas Moore, in the "Gardeners' Chronicle" (New Series, x., p. 429), and we cannot do better than extract from his very accurate description the following: "The rootstock forms a solid mass closely invested by the sterile fronds. The perfect fronds are erect, 1½ft. long, several spring up close together; in the young state they are clothed with white, stellate (star-like) hairs. The mature fronds are very thinly covered with minute scales, which are eventually rubbed off. The basal portion is about 1ft. high and 8in. broad, tapering gradually downwards to the short stalk. The ramifications of the lamina (or limb) are

confined to its upper third; there are two deep incisions near the central part of the apex, the middle segment thus formed being much smaller than the outer ones. The lateral divisions are more compound, being divided by about three successive furcations into oblong lobes, narrowing towards the apex. The decided dark green colour of the plant is one remarkable feature, the Platyceriums being usually of a greyish hue, from the abundant white, stellate scales spread over their surface."

To the above we may add that the most distinctive character, or at least the one by which *P. Hillii* can best be distinguished from *P. alcicorne majus*, is the repeated furcation of the divisions of the frond. It may also be stated here that its habit is much more rigid, its fertile fronds showing no inclination whatever to become pendulous. The fructification, as in *P. alcicorne* and its variety *majus*, is absolutely limited to the extremities of the ultimate divisions of the frond.—*Nicholson, Dictionary of Gardening*, iii., p. 158.

P. Stemmaria—Stem-ma′-rĭ-a (Stemmaria). A synonym of *P. æthiopicum.*

P. Wallichii—Wal-lich′-ĭ-i (Wallich's), *Hooker.*

This beautiful and very rare species, native of the Malayan Peninsula, and, according to Beddome, found on the banks of the Irrawaddy and of the Martaban, in Moulmein, is closely related to *P. grande.* Its barren fronds, like those of that more popular species, are deeply lobed, and their forked divisions are equally inflexed. The fertile fronds are also usually produced in pairs and pendent, but the wedge-shaped disk, which is situated between the two divisions, has a rounded upper edge, and forms a semi-circular projection, upon which may be seen two soriferous (spore-bearing) patches 3in. to 4in. broad, and from each side of this projection is produced a division which is only once-forked. These fronds are of a thick texture and have their under-side matted with a yellowish, woolly pubescence.—*Hooker, Species Filicum*, v., p. 284; *Filices Exoticæ*, t. 97. *Nicholson, Dictionary of Gardening*, iii., p. 158. *Beddome, Ferns of British India*, t. 108.

P. Willinckii—Will-inck′-ĭ-i (Willinck's), *Moore.*

This species, native of Java, whence it was introduced into this country in 1875, is thoroughly distinct from all other species at present known. From Thomas Moore's description, published in the "Gardeners' Chronicle,"



LOMARIA DISCOLOR BIPINNATIFIDA

of March 6, 1875, p. 302, we extract the following: "Like its congeners, it is epiphytal, and protects its rootstock by the broad, roundish, imbricating bases of its barren fronds. The fertile fronds, which are produced in threes, issue from the growing point, situated in a notch in the side of the round, close-fitting base of the sterile stem, and at once fall straight down to a length of 2½ft.; they are quite narrow in all their parts, the basal portion is upwards of 1ft. long, the branches are entire on one of their margins and repeatedly divided into numerous lobes on the other side." We may add that the whole plant is of a pale glaucous tint, and that the fructification occupies the terminal lobes only. See Plate.—*Nicholson, Dictionary of Gardening*, iii., p. 158.

PLATYLOMA—Plat-yl-o′-ma. *See* **Pellæa.**

CHAPTER IX.

PLATYZOMA, *Brown.*

(Plat-yz-o′-ma.)

IN Hooker and Baker's "Synopsis Filicum," *Platyzoma*, which is a division of the sub-order *Gleicheniaceæ*, forms Genus 1. Its name is derived from *platys*, broad, and *zoma*, a band, in allusion to the broad ring of the sporangia. It is a monotypic genus, that is to say, it comprises but one species, which, so far as we are aware, has not yet been introduced. Its distinguishing characters are very similar to those of the Gleichenias, to which genus it is closely allied, and, being found growing naturally under similar conditions, its culture would no doubt be the same as that recommended for the members of that beautiful and most interesting group of Ferns.

From what may be gathered from dry specimens seen in herbaria, this miniature, Gleichenia-like Fern well deserves to be introduced into our collections, where it would be most welcome as a living plant. The fact of its introduction having been so long delayed is probably due to the same difficulties which surround the importation of Gleichenias, and indeed of most Ferns provided with slender rhizomes of a woody nature. These, we find, travel best when entirely buried in damp soil.

P. microphyllum—mi-croph-yl′-lum (small-leaved), *Brown.*

This stove species, native of Tropical and Sub-tropical Australia, produces from a creeping rhizome densely clothed with fine, silky scales its fronds 8in.

to 12in. long and simply pinnate (only once divided to the midrib); these are borne on tufted, stiff, upright stalks, and are furnished with small, cucullate pinnæ (hood-shaped leaflets) of a leathery texture, scarcely $\frac{1}{12}$in. long. The sori (spore masses) consist of a few stalkless capsules mixed with a substance of a powdery nature, which arise from the extremity of the simple veinlets, and are concealed by the singularly revolute margins of the leaflets. —*Hooker*, *Species Filicum*, i., p. 2. *Nicholson*, *Dictionary of Gardening*, iii., p. 159.

PLECOSORUS MEXICANUS—Plec-os-o′-rus mex-ic-a′-nus. *See* **Cheilanthes speciosissima.**

PLEOCNEMIA—Plĕ-oc-ne′-mĭ-a. *See* **Nephrodium.**

PLEUROGRAMME—Pleur-og-ram′-me. *See* **Monogramme.**

PŒSIA—Pœ′-sĭ-a. *See* **Pteris.**

POLYBOTRYA—Pol-yb-ot′-rў-a. *See* **Acrostichum.**

CHAPTER X.

POLYPODIUM, *Linnæus.*

(Pol-yp-od′-ĭ-um.)

Polypodies.



OLYPODIUM, the Greek name used by Theophrastus, is applied to plants which, in Hooker and Baker's "Synopsis Filicum," form Genus 48; it is derived from *polys*, many, and *podion*, a little foot, in allusion to the appearance of the rhizomes and their appendages with which the majority of these plants are provided. The genus is an exceedingly large one—undoubtedly the most extensive of the Natural Order *Filices* (Ferns), and includes plants of two totally different modes of growth, each series comprising a number of species of each of the different kinds of venation and from all climates. Eaton, in his exhaustive work on "Ferns of North America" (vol. i., p. 116), says: "Mr. John Smith, former Curator of the Royal Botanical Gardens, Kew, has described and carefully distinguished the two modes of growth noticed in *Polypodium*, under the names of 'Eremobryoid' and 'Desmobryoid.' In the Eremobrya each frond springs from a separate node, more or less distant from its neighbour, and is there articulated with the rhizome; so that, when it has passed its maturity, it separates at the node, and leaves behind a clean, concave scar, as may readily be noticed in *P. aureum*. The essential distinction between the Eremobrya and the Desmobrya rests in the fronds of the former being *articulated with the axis or rhizome*, while those of the latter are *adherent and continuous with the axis or rhizome*." In the Desmobrya the spores are always medial on the veins, while in the Eremobrya, which

are by far the more numerous, they are generally, though not always, terminal on the veins.

Eaton further states (vol. i., p. 119): "The genus *Polypodium*—even when limited, as by Mettenius, to the Ferns having round or roundish, naked sori, composed of sporangia with an incomplete vertical ring, the stalks of the fronds articulated to the rhizome—contains several hundred species. Mettenius gives 260, and in the Second Edition of 'Synopsis Filicum' Baker brings up the number to 340.* The great difference in the size and outlines of the frond, in the venation, in the texture, and in the surface—whether smooth, hairy, tomentose, or scaly—and in the presence or absence of peltate scales among the sporangia, have induced writers on the subject, especially Link, J. Smith, Presl, Fée, and Moore, to propose dividing the genus into many genera, founded on the characters just referred to. But Mettenius has satisfactorily shown that the intermediate forms are so many and so perplexing that the whole is best regarded as forming but one natural genus; and in this view he has been followed by Sir W. J. Hooker and Mr. Baker, who, however, retain in *Polypodium* those Ferns which differ from *Nephrodium* only in the absence of an indusium—a character which is often the result of accident or of arrested development. These species, nearly a hundred in number, constitute the genus *Phegopteris*, and are technically distinguished from the true *Polypodia* by having the stalks continuous with the rhizome or caudex."

As previously stated, the genus *Polypodium* was formerly divided by various authors into an almost unlimited number of sub-genera; the following list of the best-known of these, with the names of their authors, will show at a glance the importance of the genus:

Abacopteris, Fée.
Adenophorus, Hooker and Greville.
Aglaomorpha, Schott.
Amblia, Presl.
Ampelopteris, Kunze.
Anapeltis, J. Smith.
Anaxetum, Link.
Apalophlebia, Presl.
Arthropteris, J. Smith.
Calymmodon, Presl.
Campyloneuron, Presl.
Chrysopteris, Link.
Cœlopteris, A. Brongniart.
Colysis, Presl.
Craspedaria, Fée.
Crypsinus, Presl.

* Nicholson, in the "Dictionary of Gardening" (vol. iii., p. 186), states that this genus comprises upwards of 450 species.

Cryptosorus, Fée.
Cyrtomiphlebium, Hooker.
Cyrtophlebium, J. Smith.
Diblemma, J. Smith.
Dictymia, J. Smith.
Dictyopteris, Presl.
Dipteris, Reinwardt.
Drynaria, Bory.
Dryostachyum, J. Smith.
Eupolypodium, Linnæus.
Galeoglossa, Presl.
Glaphyropteris, Presl.
Glyphotœnium, J. Smith.
Goniophlebium, Blume.
Goniopteris, Presl.
Grammitis, Hooker and Baker.
Gymnocarpium, Newman.
Gynosorium, Presl.
Holcosorus, Moore.
Lecanopteris, Blume.
Lepicystis, J. Smith.
Lopholepis, J. Smith.
Marginaria, Presl.
Microgramme, Presl.
Microsorium, Link.
Monachosorum, Kunze.
Niphobolus, Hooker and Baker.
Niphopsis, J. Smith.
Paragramma, Moore.
Phegopteris, Mettenius.
Phlebodium, R. Brown.
Phymatodes, Presl.
Pleopeltis, Hooker and Baker.
Pleuridium, J. Smith.
Polycampium, Presl.
Pseudathyrium, Newman.
Stegnogramma, Brackenridge.
Xiphopteris, Kaulfuss.

The greater part of the above-named sub-genera, however, have now been abandoned, and the comprehensive classification of this extensive genus is limited to the following distinct groups, which are the only divisions retained by Hooker and Baker in the "Synopsis Filicum" as sub-genera, although many of the foregoing names are still referred to by a few writers of the present day:

Campyloneuron (Camp-yl-on-eur′-on), *Presl.* In this sub-genus (belonging to the Eremobryoid series, in which the fronds are articulated with the rhizome), the primary veins are distinct from the midrib to the edge, and are connected by parallel, straight or curved, transverse veinlets; the areolæ (cells) contain two or more spore masses, and the free veinlets are all directed towards the edge. *P. angustifolium* is one of the best representatives of this sub-genus. Most of the known species have simple or undivided fronds, a few only being pinnate. *Niphobolus* forms an important section of this sub-genus.

Cyrtomiphlebium (Cyr-tom-iph-leb′-ĭ-um), *Hooker.* A small sub-genus in which the venation is similar to that of *Cyrtomium* (*Aspidium*), *i.e.*, with the contiguous groups uniting irregularly.

Dictyopteris (Dic-tŷ-op′-ter-is), *Presl.* This small sub-genus belongs, like the last, to the Desmobryoid series, in which the fronds are adherent and continuous with the rhizome. The venation is similar to that of *Sagenia* (*Nephrodium*), *i.e.*, anastomosing (intermixing copiously). In some species, the spore masses are biserial (disposed in two rows), *e.g.*, in *P. Barberi;* while in others they are scattered irregularly, a character which is shown best in *P. sparsiflorum.*

Dipteris (Dip′-ter-is), *Reinwardt.* A small yet very interesting section of the extensive sub-genus *Phymatodes.* It is of thoroughly distinct aspect through the flabellate (fan-like) form of the fronds: these are divided into two distinct halves, which are deeply lobed from the circumference in the direction of the base. *P. Dipteris* is the typical representative of this section.

Drynaria (Dryn-a′-rĭ-a), *Bory.* In this small yet very distinct section of the sub-genus *Phymatodes*, the barren and fertile fronds are sometimes distinct, a character well illustrated by *P. quercifolium;* when they are not distinct, the base of the ordinary one is pinnatifid (divided half-way to the midrib) like a stalkless Oak-leaf, brownish in colour, and rigid in texture, as in *P. Heracleum.*

Eupolypodium (Eu-pol-yp-od′-ĭ-um), *Linnæus.* This is the most extensive sub-genus belonging to the Eremobryoid series (composed of plants with fronds articulated at the point of junction with the rhizome, and spore masses generally, but not always, terminal on the veins). The veins are free and the spore masses are round, except in a few species in which they are oblong, and which form the section *Grammitis.* The outlines of the fronds and their divisions are numerous, some having entire (undivided) fronds, as *P. zeylanicum*, while others have them pinnatifid (the lobes reaching half-way or more down to the main stalk), such as those of *P. khasyanum.* The majority of the species, however, have fronds distinctly pinnate (divided to the midrib), with leaflets closely set, enlarged, and casually confluent at the base, as is frequently seen in the typical *P. vulgare;* some have their fronds bipinnatifid or even bipinnate (twice divided nearly or quite to the midrib), *e.g.*, *P. hymenophylloides*, and a few are tri- or quadripinnatifid (three or four times divided nearly to the midrib), a character shown to perfection in *P. millefolium.*

Goniophlebium (Go-nĭ-oph-leb′-ĭ-um), *Blume.* In this important and thoroughly distinct sub-genus the veins form ample, regular areolæ (cavities), each with a single, distinct, free, included veinlet, the sori (spore masses) being terminal on the latter, often in the costal cavity only, but sometimes also in the second or even third row. A few of the species included here have simple (undivided) fronds, *e.g.*, *P. glaucophyllum;* others have their fronds pinnatifid (divided half-way to the midrib), as exemplified in *P. Matthewsii;* but in the majority of the species the fronds are distinctly pinnate (once divided to the midrib), a character which is well shown in *P. subauriculatum.*

Goniopteris (Go-nĭ-op′-ter-is), *Presl.* This small sub-genus, belonging to the Desmobryoid series (in which the fronds are adherent and continuous with the rhizome), is composed of plants having the venation of *Eunephrodium*, *i.e.*, veins pinnate, with the lower veinlets of contiguous groups joining. Some species, such as *P. meniscioides*, have their leaflets entire or slightly notched; but most of them have their leaflets distinctly notched or even cleft nearly to the midrib, as in *P. Ghiesbreghtii.* A few species are proliferous (rooting at the extremity of their fronds).

Grammitis (Gram-mi′-tis), *Hooker and Baker.* A small section of the sub-genus *Eupolypodium*, being distinguished specially by the oblong shape of the spore masses, a character which is best illustrated in *P. Deplanchei.*

Niphobolus (Niph-ob′-ol-us), *Hooker and Baker.* This is a small but very interesting and distinct section of the sub-genus *Campyloneuron.* It is composed of plants with entire fronds, the under-surface of which is clothed with a substance of a woolly or cottony nature, in some cases, such as *P. Lingua*, thin and adpressed, but in other instances much thicker, more woolly, and looser, a character well shown in *P. nummulariæfolium.*

Phegopteris (Phe-gop′-ter-is), *Mettenius.* This is by far the most important sub-genus contained in the Desmobryoid series (in which the fronds are adherent and continuous with the axis or rhizome). The venation in *Phegopteris* is the same as in *Lastrea* (*Nephrodium*), all the veins being free. The outline and the divided character of the fronds vary very much: in some instances the leaflets are entire or lobed less than half-way to the midrib, as in *P. Carrii;* in other cases they are either cut more than half-way to the midrib into close, regular, nearly entire lobes, as in *P. obtusilobum*, or, as in

P. distans, they are cut nearly or quite down to the midrib into toothed or deeply-cleft lobes. In another section of *Phegopteris* the fronds are small or medium-sized, tri- or quadripinnatifid (three or four times divided nearly to the midrib), a character which is well illustrated in our "Oak Fern," *P. Dryopteris;* or the fronds are ample and many times divided, like those of *P. punctatum.*

Phlebodium (Phleb-o′-dĭ-um), *R. Brown.* This very distinct sub-genus comprises but few species. The veins form ample, regular cells, each with two or more distinct free veinlets, which bear the spore masses on their united points, the costal series of cells being always destitute of spore masses. The best-known of the species included in this sub-genus is undoubtedly *P. aureum.*

Phymatodes (Phy-mat-o′-dēs), *Presl.* This extensive sub-genus, which includes the sections *Dipteris* and *Drynaria*, is distinguished by the copious, irregular, fine cells of its fronds, the free veinlets spreading in various directions, as also by the disposition of the spore masses, which vary as to position, but are generally found on the back of the united veinlets. The majority of the species have undivided fronds, such as those of *P. longifolium*, mostly of a thick texture, with the under-surface of a matted or scurfy nature, as in *P. angustatum.* Some species, such as *P. Billardieri*, have their fronds deeply pinnatifid, while in a few of them the fronds are distinctly pinnate (divided to the midrib), a character which is best illustrated in *P. juglandifolium.*

The geographical distribution of the genus is very wide, Polypodiums of one section or another being found in nearly every part of the world. It is, however, in Central and in South America that they are most abundant; a certain number of very distinct species are found throughout India, and a few others are native of Australia and Japan. Eaton, referring to the distribution of the genus, states ("Ferns of North America," vol. i., p. 120) that "the true *Polypodia* of the United States and Canada are but eight in number. Three of these have veins free: *P. plumula* [*elasticum*], *falcatum* [a form of *P. vulgare*], and *vulgare;* two, *P. californicum* and *incanum*, have their veins sometimes free, sometimes sparingly reticulated; and three, *aureum*, *Phyllitidis*, and *Scouleri*, have their veins regularly reticulated, but in three different methods, representing respectively the sections *Phlebodium*, *Campyloneuron*,

and *Goniophlebium*." This does not include the four distinct species of *Phegopteris* also found in North America.

The British Polypodies are few in number, five species only being recorded as indigenous, and even these are of a very cosmopolitan character, their range of habitat extending to North America, Japan, &c. If British species are but few, some of the numerous varieties of *P. vulgare* (which, unlike the other native species, is of a thoroughly evergreen nature) are not found in any other country, either growing spontaneously or produced by cultivation.

Culture.

The Polypodiums, both British and exotic, are of two different structures and of various habits. A small proportion of them, such as our common "Oak" and "Beech" Ferns (*P. Dryopteris* and *P. Phegopteris*), are deciduous, and provided with slender rhizomes which delight in running underground, especially in partly-decayed vegetable matter; the foliage of these species, as a rule, is of a soft, papery texture. The majority of them, however, are of an evergreen nature, having fronds of a somewhat leathery texture, produced from rhizomes which prefer being kept above or close to the surface of the ground. In this case we may give as the typical species *P. vulgare*, of which C. T. Druery, in his excellent book, "Choice British Ferns," says (pp. 119, 120): "It is a thorough evergreen, retaining its verdure quite fresh right through the winter. The creeping rootstock is fleshy and as thick as the little finger, while the fronds are comparatively leathery and of a dark green colour, bearing on their backs the large, golden-yellow heaps of spores, which form most conspicuous and beautiful examples of the fructification peculiar to the *Polypodium* family. This Fern, by its tough nature, is enabled to stand plenty of air, and even of sunshine, and we consequently find it at home on the tops and in the crevices of old walls, on the roofs of old buildings, and cosily nestling amongst moss-grown rocks and similar places where its roots can creep freely about in accumulations of leaf mould. We also find it clothing the sloping sides of hedge-banks, and forming a dense undergrowth among the roots of the hedges themselves; and lastly, but by no means least, it makes itself a congenial

home in the mossy bark of old trees, and among the *débris* which collects in their forks and other hollows."

Those species which are provided with underground rhizomes may be either grown in pots or planted in any part of the stove, the cool Fernery, or the outdoor rockery, according to their native habitats; and for these, a mixture composed of two parts fibrous loam, one part leaf mould, and one part sharp silver sand, answers all requirements. This treatment also applies to the species in which the fronds are produced from a single crown. The epiphytal species (those provided with rhizomes of a thickness varying from that of a quill pen to that of a man's thumb), which do not burrow, but keep near, or even on, the surface of the soil, require a different material to grow luxuriantly. In their case, good fibrous peat, or, better still, half-decayed leaf mould, should form the best part of their compost, in which silver sand is not needed, but to which a fourth part of fibrous loam may be added to give it cohesion. Whether grown in pots or planted in the rockery, these species should have good drainage and comparatively shallow pots or pockets. The epiphytal species are particularly adapted for covering Tree-Fern stems and for growing in hanging baskets, in which positions their rambling habit is shown to great advantage.

The majority of Polypodiums are propagated by division of their rhizomes, which operation may be carried out at almost any time of the year; but a few species grown extensively for decorative purposes are more rapidly propagated by means of their spores, which are abundantly produced, germinate freely, and produce better-shaped plants than those obtained from division of the rhizomes.

Principal Species and Varieties.

P. (Phymatodes) accedens—Phy-mat-o′-dēs; ac-ce′-dens (approaching), *Blume.*

This pretty and singular, stove species, which Beddome gives as a Pleopeltis, is a native of Malaysia and the Philippines. It is readily distinguished by the thread-like nature of its very wide-creeping rhizome, which is scarcely scaly. Its fronds, which are of two distinct forms, are borne upon very short stalks; the barren ones are oblong and blunt, while

the fertile ones, longer and narrower (2in. to 4in. long and ¼in. to ½in. broad), have their fructification confined to the upper part, which is narrowed or conspicuously contracted. The fronds are of a leathery texture and smooth on both sides, and the sori (spore masses) are disposed in single rows close to the midrib. Fig. 31 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 66. *Beddome*, *Ferns of British India*, t. 215.



Fig. 31. Polypodium accedens (¼ nat. size).

P. achilleæfolium — ach-ill-e′-æ-fol′-ĭ-um (Achillea-leaved), *Kaulfuss.*

A small-growing, stove species, native of Ecuador and Brazil, with oblong-spear-shaped fronds 3in. to 5in. long, 1in. to 1½in. broad, produced from a single crown, and borne on tufted stalks barely 1in. long, of a wiry nature, but clothed with short, soft, spreading hairs. The leaflets, of a leathery texture, closely set, and spreading, are deeply cleft into narrow lobes, each of which bears a spore mass.—*Hooker*, *Species Filicum*, iv., p. 225.

P. (Niphobolus) acrostichoides — Niph-ob′-ol-us ; ac-ros′-tich-ŏ-i′-des (Acrostichum-like), *Forster.*

This stove species, native of Ceylon, Malaysia, the Philippines, the New Hebrides, Queensland, &c., and rare in cultivation, possesses a very peculiar appearance on account of its singularly long and comparatively narrow, leathery, drooping fronds being produced at long intervals apart on a wide-creeping, woody rhizome, clothed with roundish scales black in the centre. The fertile and the barren fronds are similar in shape and size, and are also produced in about equal proportions ; they are borne on firm, upright stalks 1in. to 3in. long, and they sometimes measure as much as 2ft. in length by only 1in. in

breadth, although they are oftener of the same breadth and only 1¼ft. to 1½ft. in length, and narrowed very gradually below. These fronds are of a very leathery texture, naked on their upper surface, but densely clothed on their under-side with a dirty white, woolly substance of a persistent nature. The small, bright-coloured, closely-set sori (spore masses) are not immersed; they cover the under-side of the upper part of the frond (Fig. 32). —*Hooker, Species Filicum*, v., p. 44. *Nicholson, Dictionary of Gardening*, iii., p. 186. *Beddome, Ferns of British India*, t. 81.



Fig. 32. Polypodium acrostichoides (much reduced).

P. adenophorus — ad-e-noph′-or-us (gland-bearing), *Hooker and Arnott.*

A stove species, native of the Sandwich Islands and Peru, with sub-sessile (almost stalkless), flaccid, pendulous fronds, 6in. to 12in. long, ¾in. to 1in. broad, cut down nearly or quite to the midrib into sharp-pointed, slightly undulated, horizontal or even rather decurved leaflets ⅛in. broad and enlarged at the base. They are of a somewhat leathery texture and nearly naked on both sides, and the sori (spore masses) are disposed in rows, close to the midrib.—*Hooker, Species Filicum*, iv., p. 195.

P. (Niphobolus) adnascens—Niph-ob′-ol-us; ad-nasc′-ens (adnascent), *Swartz.*

Contrary to the majority of the plants comprised in the genus, this stove species, native of Ceylon, Fiji, the Mascarene Islands, and Southern India (where, according to Beddome, it grows in forests from the plains to 5000ft. elevation), is provided with two kinds of totally different fronds, the barren ones being scarcely half the size of the fertile ones. The difference, however, is not limited to size only, for it is further shown in the shape, which in the

barren ones is spathulate (spoon-shaped) and blunt, while the fertile ones are longer and narrower (6in. to 12in. long and ¼in. to ½in. broad). Both kinds of fronds are produced from a firm but slender rhizome clothed with narrow, deciduous scales, and borne on firm, erect stalks seldom more than 1in. long; they are smooth and of a dark green colour above, while their under-side is thinly coated with a whitish, woolly substance. The small, bright-coloured sori (spore masses) are immersed, and occupy the whole of the contracted upper part of the frond.—*Hooker*, *Species Filicum*, v., p. 47; *Garden Ferns*, t. 19. *Nicholson*, *Dictionary of Gardening*, iii., p. 186. *Beddome*, *Ferns of Southern India*, t. 184.

P. (Goniophlebium) adnatum — Go-nĭ-oph-leb′-ĭ-um; ad-na′-tum (adnate), *Kunze*.

A strong-growing, stove species, native of Guatemala, with fronds 1½ft. to 3ft. long, 1ft. broad, and borne on naked, glossy stalks 6in. to 12in. long. They are composed of several pairs of oblong-spear-shaped leaflets, the upper ones broadly attached to the midrib at their base, and of a terminal one of similar shape, 6in. to 9in. long, and 1½in. to 2in. broad. All the leaflets are of a somewhat leathery texture, with sori (spore masses) disposed in rows of four to six between the midrib and the edge.—*Hooker*, *Species Filicum*, v., p. 27. *Nicholson*, *Dictionary of Gardening*, iii., p. 186.

P. (Phymatodes) affine—Phy-mat-o′-dēs; af-fi′-nĕ (related), *Blume*.

This strong-growing, stove species, native of the Moluccas and Philippine Islands, somewhat resembles the better-known *P. nigrescens;* but it is easily distinguished from that plant through the disposition of its spore masses, which are not immersed and are placed in two or three irregular rows between the midrib and the edge. The fronds, 2ft. to 4ft. long and 1ft. or more broad, are produced from a scaleless rhizome of a woody nature, and borne on firm stalks 1ft. to 1½ft. long and of a particularly glossy appearance.—*Hooker*, *Species Filicum*, v., p. 84.

P. (Niphobolus) africanum—Niph-ob′-ol-us; af-ric-a′-num (African), *Mettenius*.

A greenhouse species, native of Kaffraria, Natal, Zambesi Land, Angola, and the Guinea Coast. From a stout rhizome densely clothed with large grey

scales are produced its sub-sessile (almost stalkless) fronds 6in. to 12in. long, ½in. to 1½in. broad, gradually narrowed to both ends, and with smooth edges ; they are of a leathery texture, naked on the upper surface, but densely coated underneath with a close, nearly white substance of a woolly nature, into which the spore masses, of a particularly bright colour and spread over the whole upper portion of the frond, are sunk. — *Hooker*, *Species Filicum*, v., p. 45.

P. (Phymatodes) alatum—Phy-mat-o′-dēs ; al-a′-tum (winged), *Hooker*.

This stove species, of medium dimensions, native of the Fiji Islands, produces from a scaleless rhizome of a woody nature fronds 1½ft. to 2ft. long, 10in. to 12in. broad, which are borne on firm, upright stalks 1ft. to 1½ft. long ; they are cut down nearly to the midrib below, and within ½in. of it above, into numerous narrow-oblong, sharp-pointed lobes 6in. to 8in. long and 1in. or more in breadth. The texture is soft and papery, and the fronds are naked on both sides. The rather small and abundant sori (spore masses) are disposed in rows of three or four near the main veins.—*Hooker*, *Species Filicum*, v., p. 85.

P. (Niphobolus) albicans—Niph-ob′-ol-us ; al′-bic-ans (whitish), *Mettenius*.

A stove species, native of Java, producing from a stout rhizome, clothed with somewhat large, spear-shaped, light-coloured scales, fronds 1ft. to 2ft. long, 1in. to 2in. broad, and borne on firm, upright, naked stalks 2in. to 4in. long. They are gradually narrowed towards both ends, with smooth edges, and are of a very leathery texture ; their upper surface is smooth, but their under-side is densely clothed with a woolly substance of a pale rusty-brown colour. The sori (spore masses) are disposed in close rows of three or four each between the veins.—*Hooker*, *Species Filicum*, v., p. 51.

P. albidulum—al-bid′-ul-um (slightly whitish), *Baker*.

This greenhouse species, native of Rio Janeiro, is of tufted, close habit, its pendulous, spear-shaped fronds, 4in. to 8in. long and ½in. to ¾in. broad, being produced from a short, upright stem and borne on firm, slender, naked stalks 1½in. to 2in. long and of a grey colour. The fronds are of a somewhat leathery texture, and are cut down to the midrib into strap-shaped leaflets

densely covered with a whitish powder underneath. The round and superficial sori (spore masses) are disposed along the margins of the fertile leaflets.—*Hooker*, *Synopsis Filicum*, p. 509.

P. albo-punctatissimum—al′-bo–punc-ta-tis′-sim-um (much dotted with white). A variety of *P. crassifolium.*

P. (Phymatodes) albo-squamatum—Phy-mat-o′-dēs ; al′-bo–squa-ma′-tum (having white scales), *Blume.*

This is a very distinct, stove species, of large dimensions, native of Malaysia and the Philippine Islands. Its singular-looking fronds, produced from a woody rhizome clothed with dense, dark brown scales sometimes 1in. long, are borne on firm, erect stalks 6in. to 12in. long and glossy ; they are sometimes simple (undivided) but usually pinnate (once divided to the midrib), 1ft. to 2ft. long, 1ft. or more in breadth, with several distant, spreading leaflets 6in. to 10in. long, ½in. to ¾in. broad, very sharp-pointed at the extremity, but narrowed at the base, the lower ones being stalked. The fronds are of a somewhat leathery texture, and their upper surface is decorated with small, white, scale-like dots either at the edge or all over. The sori (spore masses) are disposed in a single row midway between the midrib and the edge.—*Hooker*, *Species Filicum*, v., p. 92 ; *Garden Ferns*, t. 47. *Nicholson*, *Dictionary of Gardening*, iii., p. 186.

P. (Phegopteris) alpestre—Phe-gop′-ter-is ; al-pest′-rĕ (alpine), *Hoppe.*

This very elegant and perfectly hardy species, native of Scotland, Norway, Sweden, Switzerland, Germany, Russia, the Pyrenees, &c., is most appropriately named, as, whether in Europe or in North America, it is found only at high elevations. As a British plant it is the least known of the whole genus, probably on account of the restriction of its habitat, which appears limited to a few localities in Scotland, where, however, it usually grows in abundance, and generally in company with the "Lady Fern" (*Asplenium Filix-fœmina*). It is probably also on account of possessing a general aspect similar to that of the "Lady Fern" that its existence as a British species has been ignored until a comparatively recent date, for its first discovery in the British Isles is attributed to Mr. H. C. Watson, who in 1841 gathered it on Ben Aulder, in Inverness-shire ; and in 1844 a frond

was brought from Canlochen Glen, in Forfarshire. It has more recently been found in Perthshire, in Aberdeenshire, and in one or two other places in the Scottish Highlands, where it grows in quantity. Lowe, in his exhaustive work, "Our Native Ferns" (vol. i., p. 13), states: "In 1852 Mr. T. Westcombe and Mr. Backhouse, of York, procured it in great abundance in Canlochen, Glen Prosen, Glen Fiadh, and on all the Dee-side mountains. Mr. Backhouse remarks that at an elevation of from 2000ft. to 3000ft. this Fern was found mingled with the Lady Fern; above this height the Lady Fern ceased, and left the Alpine Polypody in sole possession, flourishing most in the more open situations." Referring to the Alpine Polypody, Eaton, in his excellent work, "Ferns of North America" (vol. i., p. 172), says: "It grows in a limited locality, so far as I know, near the summit of Mount Rose, near Webber Lake, and, say, at an elevation of 7000ft., latitude 39½deg. N." He also states that it is found growing amongst rocks at high elevations on Lessen's Peak, Mount Shasta, Pyramid Peak, Mount Rose, and other points in the Sierra of California; and on the Cascade Mountains of British Columbia. It is therefore thoroughly hardy, and grows readily in a well-drained, loamy, porous compost.

P. alpestre is a pretty, delicate-looking Fern. Its oblong-spear-shaped fronds, 2ft. or more in length, 6in. to 8in. broad, and borne on tufted stalks 4in. to 6in. long and scaly below, are disposed in circular tufts at the ends of the rootstocks on which they are produced, and which in a wild state are completely underground and much branched. The spear-shaped leaflets, of a soft, papery texture, 3in. to 4in. long, and 1in. to 1¼in. broad, are again divided into spear-shaped leafits, which are in their turn deeply cleft into toothed lobes, each bearing from one to four small spore masses.—*Hooker*, *British Ferns*, t. 6. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Our Native Ferns*, i., t. 2. *Eaton*, *Ferns of North America*, i., t. 23.

This interesting species has produced, either spontaneously or through cultivation, several varieties, the most distinct of which are as follow:

P. a. flexile—flex′-il-ĕ (pliable), *Moore.*

We have in this variety, which is said to occur only on the Clova Mountains, where it was found in Glen Prosen by Mr. Backhouse, a very handsome and distinct form of the species, with fronds 8in. to 12in. long,

about 2in. broad, of a more slender habit, and with shorter leaflets and leafits much less in number. These fronds, of a very light green colour, are almost stalkless, the midrib extending nearly to the base of the frond. This variety is further distinguished by the peculiarity of its fructification, the sori (spore masses) being situated chiefly at the base of the frond, the extremity of which is invariably barren.—*Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Our Native Ferns*, i., t. 3.

P. a. interruptum—in-ter-rup′-tum (interrupted), *Moore*.

A very curious form, raised from spores in Sim's late establishment at Foot's Cray, Kent. It has the habit and general appearance of *P. a. flexile*, from which it is issue, but has many of its primary divisions (leaflets) much and in various ways shortened, their divisions (leafits) appearing much toothed or torn.

P. a. laciniatum—lac-in-ĭ-a′-tum (fringed), *Stansfield*.

This very pretty and distinct variety, raised from spores in the Fernery of Messrs. Stansfield, of Todmorden, is distinguished from the variety *flexile* by its densely-set leaflets, which are fringed and recurved towards the base of the stalk, short, and rounded at the end. The sori (spore masses) are disposed along the midvein.—*Lowe*, *Our Native Ferns*, i., t. 3.

P. a. lanceum—lan′-cĕ-um (spear-shaped), *Moore*.

A variety having large fronds three times divided to the midrib, with leafits lengthened out and deeply cleft; their segments being bluntly notched. It was found on the Clova Mountains, and also at Lochnagar, Aberdeenshire. —*Lowe*, *Our Native Ferns*, i., p. 13.

P. alternifolium—al-tern-if-ol′-ĭ-um (alternate-leaved), *Hooker*.

This very distinct, stove species, native of the Andes of Ecuador, possesses a very pleasing appearance through its flaccid, pendent fronds, 2ft. to 10ft. long and 2in. broad, being borne on very short, tufted, slender stalks clothed with soft, spreading hairs. The leaflets, distinct and alternate (not opposite), are spear-shaped, entire, and about ¼in. long at the base; they are of a very soft, papery texture, with a blackish midrib, close to which the spore masses are disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 222, t. 277A.

P. ambiguum—am-big′-ŭ-um (ambiguous), *Mettenius.*

A stove species, of medium dimensions, native of Venezuela, and somewhat resembling the better-known *P. subpetiolatum.* It produces from a densely-scaly, wide-creeping rhizome, ¼in. thick, its spear-shaped fronds 1ft. to 1¼ft. long, 4in. to 5in. broad, furnished with numerous leaflets of a parchment-like texture, narrowed to a point, equal at the base, and entire; they are of a bright green colour and finely downy. The copious and conspicuous sori (spore masses) are closely set near to the midrib.—*Hooker*, *Synopsis Filicum*, p. 510.

P. (Niphobolus) americanum — Niph-ob′-ol-us; am-er-ic-a′-num (American), *Hooker.*

According to Hooker and Baker, this is the only American species of *Niphobolus.* It is a robust-growing, stove species, of large dimensions, native of the Andes of Ecuador. The very thick rhizome, clothed with large, grey scales, bears, on strong, erect stalks 1in. to 4in. long, fronds 1½ft. to 2ft. long, ½in. to ¾in. broad, very gradually narrowed downwards, and with reflexed edges; they are of a very leathery texture, and their upper surface, woolly when young, is naked, bright green, and pitted when mature, while their under-surface is densely coated with a loose, woolly substance of a dirty-white colour. The large and immersed sori (spore masses) are disposed in single, oblique rows of four between the midrib and the edge.—*Hooker*, *Species Filicum*, v., p. 54.

P. (Goniophlebium) amœnum — Go-nĭ-oph-leb′-ĭ-um; am-œ′-num (pleasing), *Wallich.*

A greenhouse species, of medium size, native of Nepaul, Khasya, Bhotan, and Kumaon, where, according to Beddome, it is found growing at elevations varying between 6000ft. and 10,000ft. Its fronds, 1ft. to 2ft. long and 6in. to 12in. broad, are produced from a stout rhizome densely clothed with scales of a dull brown colour, and borne on firm, erect, naked stalks 6in. to 12in. long; they are cut down nearly to the rachis into numerous entire or slightly-toothed leaflets 3in. to 6in. long, of a papery yet firm texture, and the spore masses are disposed in a single series.—*Hooker*, *Species Filicum*, v., p. 24. *Beddome*, *Ferns of British India*, t. 5.

P. (Phegopteris) amplum—Phe-gop′-ter-is ; am′-plum (large), *Humboldt.*

This stove species, native of Martinique, is a plant of very large dimensions, with fronds tripinnatifid (three times divided nearly to the midrib), and furnished with oblong, blunt segments of smooth texture and slightly dented at the edge (Fig. 33). The large and conspicuous sori (spore masses) are disposed in one row on each side of the midvein, and eventually cover the whole under-side of the frond.—*Lowe, Ferns British and Exotic*, ii., t. 52.



Fig. 33. Segment of Mature Frond of Polypodium amplum (much reduced).

P. andinum—and′-in-um (native of the Andes), *Hooker.*

This stove species, of small dimensions, native of the Andes of Ecuador and Peru, has fronds nearly stalkless, 4in. to 6in. long, ¼in. to ½in. broad, and cut about a third of the way down to the midrib into regular, blunt lobes, the lower part of which is very gradually narrowed. These fronds are of a somewhat leathery texture, and are thinly coated on both sides with soft, spreading hairs. The large, round sori (spore masses) are disposed one to each lobe.—*Hooker, Species Filicum*, iv., p. 178 ; *Second Century of Ferns*, t. 6.

P. (Goniopteris) androgynum — Go-nĭ-op′-ter-is ; an-drog′-yn-um (hermaphrodite), *Poiret.*

This strong-growing, stove species, also known in gardens under the name of *P. tetragonum*, is a native of Cuba, Panama, Brazil, and Peru. Its fronds, which are 1ft. to 3ft. long, 1ft. or more in breadth, and borne on erect stalks 1ft. to 2ft. long, naked or slightly hairy, are furnished with numerous leaflets which vary greatly in their breadth and in the depth of their lobes. These leaflets are usually 6in. to 8in. long and ½in. to 1in. broad ; the lowest, narrowed at the base and sometimes stalked, are cut from a quarter to half-

way down into blunt lobes. They are of a thin, papery texture, slightly hairy on their under-side, and the spore masses are disposed in rows near the midrib. —*Hooker*, *Species Filicum*, v., p. 3.

P. (Phymatodes) angustatum—Phy-mat-o′-dēs ; an-gus-ta′-tum (narrow), *Swartz.*

This stove species, native of North and Southern India and of New South Wales, is seldom met with in cultivation. Yet it is so distinct and so striking as to be easily remembered when once seen (Fig. 34). Its strap-shaped, entire fronds, 6in. to 12in. long, ½in. to 1½in. broad, and of a very leathery texture, borne on strong, upright stalks 2in. to 4in. long, are produced from a stout, wide-creeping rhizome clothed with whitish and very narrow scales. The upper surface is naked and of a dark green colour, while the under-side is clothed with a cottony substance of a rusty-brown colour. The fertile fronds are set off to advantage by the sori (spore masses), which are large and conspicuous, generally disposed in rows near the edge of the contracted upper part of the frond. *P. angustatum* of Blume is synonymous with *P. palmatum.—Hooker*, *Species Filicum*, v., p. 44 ; *Garden Ferns*, t. 20. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Beddome*, *Ferns of Southern India*, t. 185.



Fig. 34. Polypodium angustatum (¼ nat. size).

P. (Campyloneuron) angustifolium—Camp-yl-on-eur′-on ; an-gus-tif-ol′-ĭ-um (narrow-fronded), *Swartz.*

This evergreen, stove species, of singular and distinct appearance, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841, is a native of the West Indies and America, being found in Cuba, Jamaica, Mexico, Peru, and Brazil. It is a very variable plant as regards the breadth of its fronds, which are produced from a stout rhizome creeping on

the surface of the ground and clothed with spear-shaped scales of a brown colour and of a deciduous nature. These fronds are 1ft. to 1½ft. long and usually ¼in. broad (though narrower in the variety *ensifolium* of Willdenow), quite entire, pointed at their extremity, but with the lower part very gradually narrowed into a short stalk; their texture is leathery and they are naked on both sides, with their edges often rolled under. The sori (spore masses) are disposed in from one to four rows between the midrib and the edge.—*Hooker*, *Species Filicum*, v., p. 40. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Ferns British and Exotic*, i., t. 48.

P. apiculatum—ap-ic-ul-a′-tum (sharp-pointed), *Kunze.*

A stove species, of medium dimensions, native of Columbia, Guiana, and Brazil, with spear-shaped fronds terminating in a sharp, tail-like point. The fronds are produced from a stout, short-creeping rhizome of a woody nature, and borne on rigid, upright stalks 1in. to 2in. long and of a grey colour; they are seldom more than 8in. long and 1½in. broad, and are cut down to the midrib into narrow, sharp-pointed leaflets of moderately firm texture, dull green and naked on both surfaces. The sori (spore masses) fill up the space between the midrib and the edge.—*Hooker*, *Species Filicum*, iv., p. 185.

P. (Phegopteris) appendiculatum—Phe-gop′-ter-is; ap-pen-dic-ul-a′-tum (having appendages?), *Wallich.*

This stove species, native of East Himalayas and Penang, is not the *P. appendiculatum* usually met with in gardens, and which is merely a form of *P. plesiosorum*. Its broadly-spear-shaped fronds, 1½ft. to 2ft. long and 8in. to 10in. broad, are borne on tufted stalks about 1ft. long; they are furnished with leaflets 3in. to 5in. long, ¾in. to 1in. broad, and cut down nearly to the midrib into narrow-oblong, sickle-shaped lobes of a soft, papery texture. The lower leaflets have a small gland at the base. The spore masses are disposed close to the midrib.—*Hooker*, *Synopsis Filicum*, p. 306. *Beddome*, *Ferns of British India*, t. 256.

P. (Phegopteris) aquilinum—Phe-gop′-ter-is; aq-uil-i′-num (eagle-like), *Thouars.*

This strong-growing, stove species, native of Tristan d'Acunha, has the general habit of the common Bracken (*Pteris aquilina*). Its ample and much-

divided fronds, 2ft. to 4ft. long, 1ft. to 1½ft. broad, and produced from a stout, creeping rhizome, are borne on stout, upright stalks 1ft. to 2ft. long, of a brown colour, hairy on their whole length except at the base, where they are densely scaly. The leaflets, 6in. to 9in. long and 4in. to 5in. broad, are much overlapping, and their spear-shaped leafits are again divided into narrow-oblong, entire segments, the whole being of a leathery texture. The minute and copious sori (spore masses) are partly covered by the recurved margins of the fertile segments.—*Hooker*, *Species Filicum*, iv., p. 270.

P. (Phlebodium) areolatum — Phleb-o′-dĭ-um ; ar-ĕ-ol-a′-tum (having areolæ). A variety of *P. aureum.*

P. (Goniophlebium) argutum — Go-nĭ-oph-leb′-ĭ-um ; ar-gu′-tum (pungent ?), *Wallich.*

A greenhouse species, which, according to Beddome, occurs in Nepaul, Kumaon, Sikkim, Khasya, &c. Its somewhat upright, oblong-spear-shaped fronds, 1ft. to 2ft. long, 8in. to 12in. broad, and simply pinnate, are produced from a slender, firm, wide-creeping rhizome, covered with narrow, dark brown scales, and borne on naked stalks 3in. to 6in. long. The narrow-strap-shaped leaflets, of a soft, papery texture, are bright green and naked on both surfaces, and the spore masses are disposed in a single row nearer the midrib than the edge.—*Hooker*, *Species Filicum*, v., p. 32. *Beddome*, *Ferns of British India*, t. 6. *Nicholson*, *Dictionary of Gardening*, iii., p. 187.

P. (Phegopteris) asperulum—Phe-gop′-ter-is ; as-per′-ul-um (somewhat rough), *J. Smith.*

This stove species, of medium dimensions, native of the Philippines, has a peculiar appearance produced by the unequal-sided character of its leafits and of their segments. Its much-divided fronds, 1½ft. to 2ft. long and 1ft. or more in breadth, are of a somewhat leathery texture. The spore masses are disposed one to each ultimate lobe.—*Hooker*, *Species Filicum*, iv., p. 257. *Nicholson*, *Dictionary of Gardening*, iii., p. 187.

P. (Goniopteris) asplenioides — Go-nĭ-op′-ter-is ; as-ple-nĭ-ŏ-i′-des (Asplenium-like). A variety of *P. reptans.*

P. athyrioides—ath-yr-ĭ-ŏ-ĭ′-des (Athyrium-like), *Hooker*.

A greenhouse species, of small dimensions, native of Peru, with fronds 8in. to 12in. long, 1in. to 2in. broad, borne on firm, wiry stalks 2in. to 3in. long and slightly hairy. The narrow-spear-shaped leaflets, about ¼in. broad, are cut half-way down to the midrib into close, oblong lobes; the lower leaflets are very gradually reduced. All are of a somewhat leathery texture, and the copious sori (spore masses) are oblong.—*Hooker*, *Species Filicum*, iv., p. 224, t. 277B.

P. attenuatum—at-ten-ŭ-a′-tum (attenuated). A synonym of *P. Brownii*.

P. (Phlebodium) aureum—Phleb-o′-dĭ-um ; au′-rĕ-um (golden), *Linnæus*.

This deservedly popular species, which thrives equally well under either greenhouse or stove treatment, possesses a very wide range of habitat, being common in the West Indies, in South America as far as Brazil, and even being reported by Dr. Mueller from Australia. According to Lowe, it was introduced into England in the year 1742, and received at the Royal Gardens, Kew, in 1809. Eaton, in his exhaustive work on "Ferns of North America," says that *P. aureum* is epiphytic on trees, especially on the Palmetto in the Peninsula of Florida. Referring to its discovery, that writer states (vol. i., p. 119): "It was discovered long ago in the West Indies, and received from the ante-Linnæan botanists a variety of names. Plumier figured it at Plate 76 of his magnificent folio 'Traité des Fougères de l'Amérique' (published in 1705), and named it *Polypodium majus aureum*. He says: 'Ce Polypode a la racine grosse environ d'un pouce, et longue bien souvent d'un pied, ronde, noüeuse, rameuse, charnuë, verdastre en dedans, d'un gout astringent, et toule couverte de petites écailles dorées.' (The root of this Polypody is about 1in. thick and very often 1ft. long, round, knotty, branching, fleshy, greenish inside, of an astringent taste, and completely covered with small, golden scales.)"

P. aureum is a strong-growing Fern, strikingly bold in habit (Fig. 35), and, owing to the glaucous tint of its massive foliage, conspicuous. In very young plants the fronds are simple or three-lobed, but in fully-developed specimens they are 3ft. to 5ft. long and 9in. to 18in. broad, and are composed of a long, narrow-spear-shaped terminal leaflet, and of a variable number—

from five to fifteen—of horizontal, entire, but undulated leaflets, 4in. to 9in. long, about 1in. broad, and separated from each other by more or less rounded and open sinuses, leaving a wing or border of about ½in. along each side of the rachis (midrib of the leafy portion). The two lowest leaflets are sometimes distinctly separated from the rest and are usually slightly decurved. Eaton, referring to the rhizome from which these fronds



Fig. 35. Polypodium aureum
(much reduced).

are produced, says (vol. i., p. 166) : "As in all true *Polypodia*, the rootstock bears scattered prominences, or knobs, to which the separate stalks of the fronds are articulated, and from which they fall away when finally withered." The popular appellation of "Golden Polypody," under which this handsome Fern is commonly known, may be derived from the shining nature and bright brown colour of the scales with which the older portions of its rhizomes are

covered, but it may also be due to the intense golden colour of the under-side of its fertile fronds, which is produced by the presence of the enormous quantity of spore masses, disposed irregularly in one, two, or three series, and from which, when ripe, a most profuse, fine, bright yellow powder escapes and covers the upper surface of the fronds that are beneath them.—*Hooker*, *Species Filicum*, v., p. 16. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Ferns British and Exotic*, ii., t. 5. *Eaton*, *Ferns of North America*, i., t. 16.

There are in commerce and extensively grown three plants so closely related to *P. aureum* that, although usually considered in gardens as distinct species, the authors of "Synopsis Filicum" acknowledge them only as varieties. These are:

P. a. areolatum — ar-ĕ-ol-a′-tum (areolate), *Humboldt, Bonpland, and Kunth.*

A very interesting plant, native of South America and Mexico, with fronds smaller and of a more leathery texture than those of the species, and deeply pinnatifid; their leaflets, narrowly spear-shaped, somewhat sharp-pointed, and with moderately reflexed edges, being cut nearly to the midrib. The fronds, 1ft. to 2ft. long, are glaucous underneath, and the sori (spore masses) are disposed in a single row.—*Hooker*, *Synopsis Filicum*, p. 347. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Ferns British and Exotic*, ii., t. 12.

P. a. pulvinatum—pul-vi-na′-tum (cushion-like), *Link.*

This variety, native of Brazil, was, according to Lowe, introduced into the Royal Gardens, Kew, in the year 1841. Its fronds, which are of about the same dimensions as those of the species, are deeply pinnatifid, their leaflets being less wavy but more deeply cut towards the midrib; they, however, lack the beautiful colour of those of the species, being pale green and hardly at all glaucous. *P. a. pulvinatum* is nevertheless a distinct and pretty plant, the most attractive part of it being undoubtedly the under-surface of its fronds, which is copiously furnished with beautiful orange-yellow sori (spore masses). —*Hooker*, *Synopsis Filicum*, p. 347. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Ferns British and Exotic*, ii., t. 56.

P. a. sporadocarpum—spor-ad-oc-ar′-pum (spore-fruited), *Willdenow*.

This variety, commonly met with in gardens under the name of *P. glaucum*, is a native of South America, and is found most plentifully in Mexico. According to Lowe, it was introduced into the Royal Gardens, Kew, in 1843. If only the lovely colour of its foliage be taken into consideration, this variety, which is the *Phlebodium sporadocarpum* of J. Smith and also of Moore and Houlston, is certainly the handsomest of the group to which it belongs, being of a bluish tint not even approached by any of the others. Its habit is not, however, so elegant as that of the species, its fronds being borne on longer and slenderer stalks; the leaflets are also narrower and more distant from each other than those of *P. aureum*, but they are of a thicker texture and are bordered all round on their upper surface with small, white closely-set dots, and forming a singular and pleasing contrast with the bluish ground-colour. The fronds are also produced in greater abundance from a rhizome which branches more freely than that of either the species or its other varieties.—*Lowe, Ferns British and Exotic*, ii., t. 6.

As purely decorative plants, *P. aureum* and its varieties are extremely useful and may be utilised in various ways, their massive fronds producing a striking contrast with those of other Ferns with which they are associated in the warm Fernery. When planted out, the rhizomes grow apace and produce fronds in abundance; though usually seen on the surface of the soil, they are also subterranean and have the property of extending underground to very long distances, with articulated fronds disposed upon them at short intervals. These plants may also be used with great advantage in hanging baskets of large dimensions, either by themselves or intermixed with other Ferns with finer foliage, or for covering Tree-Fern stems. Thus grown, their thick, chaffy rhizomes show to perfection, the whiteness of the scales with which their extremities are densely clothed being apparent, and contrasting pleasingly with the golden colour of the scales of their other portions.

The value of these Ferns for decorative purposes is sufficiently attested by the fact that thousands of them annually find their way to Covent Garden Market; some growers, indeed, make quite a speciality of them, as much on account of their rapid growth as because of their distinct habit. Although the fronds have a natural tendency to be produced from a single rhizome, the

plants may, by judicious treatment, be rendered useful as pot subjects. To obviate this mode of growth, the extremity of the rhizome is entirely cut off when only about 2in. long, the result of that operation being the production of several lateral rhizomes growing out of the mutilated one in all directions, thus making bushy and compact plants. Being evergreen and strong growers, *P. aureum* and its varieties require substantial food; a mixture consisting of about equal proportions of fibrous peat, loam, and silver sand suits them best. They must also receive a liberal supply of water at the roots while growing, as well as occasional waterings with weak liquid manure.

P. (Phegopteris) auriculatum—Phe-gop′-ter-is; aur-ic-ul-a′-tum (eared), *Wallich.*

A very robust-growing species, succeeding as well under greenhouse treatment as in the stove; is a native of the Himalayas, where, according to Beddome, it is found at 6000ft. elevation. The ample fronds, 3ft. to 4ft. long and 1ft. or more in breadth, are borne on tufted stalks 1½ft. to 2ft. long, hairy in their young stage, but becoming gradually smooth as the fronds attain maturity. The leaflets, 6in. to 8in. long, 1in. broad, and of a soft, papery texture, are cut down nearly to the midrib into close, spreading, entire, blunt lobes; the lower leaflets are frequently reduced to mere auricles and furnished with a prominent gland at the base beneath. The upper surface of the fronds is of a bright green colour, while they are slightly hairy on their under-side. The spore masses are disposed about half-way between the edge and the midrib.—*Hooker*, *Species Filicum*, iv., p. 238. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Beddome*, *Ferns of British India*, t. 203.

P. (Phegopteris) auritum—Phe-gop′-ter-is; au-ri′-tum (eared), *J. Smith.*

A stove species, of medium dimensions, but of little decorative value, native of the East Indies, with pinnate fronds, about 1ft. long, dark green above, and paler beneath. The very conspicuous veins are of a much darker colour than the fronds.—*Lowe*, *Ferns British and Exotic*, ii., t. 51.

P. (Grammitis) australe—Gram-mi′-tis; aus-tra′-lĕ (Southern), *Mettenius.*

A greenhouse species, of small dimensions, producing from a creeping rhizome forming a dense mass its singular little fronds, seldom more than 6in.

long, the small ones spathulate (spoon-shaped), the larger ones ligulate (strap-shaped), bluntish at the point, gradually tapering downwards into a short stalk; they are of a leathery texture and with edges slightly hairy. The abundant and closely-set sori (spore masses) are oval or oblong, and disposed in rows nearer the midrib than the edge. The habitat of this singular species is very extensive, as it is found in the Southern extremity of America and adjacent islands, Tristan d'Acunha, New Zealand, and Australia, as far north as Queensland and New Caledonia.—*Hooker*, *Species Filicum*, iv., p. 167.

P. barbatulum—bar-ba′-tul-um (slightly bearded), *Baker*.

A stove species, native of Bourbon; it is of no decorative value, seldom exceeding 2in. in height.—*Hooker*, *Synopsis Filicum*, p. 323.

P. (Dictyopteris) Barberi — Dic-tў-op′-ter-is; Bar′-ber-i (Barber's), *Hooker*.

This very distinct, stove species, native of the Malayan Peninsula and Islands, is remarkable on account of its occasionally hand-shaped or palmately five-lobed, but more usually pinnate, fronds, borne on tufted stalks 6in. to 12in. long, slightly scaly at the base. They consist of a large terminal segment and from one to four pairs of leaflets 4in. to 6in. long, 1in. broad, and nearly entire, of a somewhat leathery texture, and naked on both sides. The spore masses, produced in abundance, are disposed principally in two rows near the main veins. Fig. 36 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 100. *Beddome*, *Ferns of British India*, t. 322.



Fig. 36. Frond of Polypodium Barberi (¼ nat. size).

P. (Goniophlebium) Beddomei — Go-nĭ-oph-leb′-ĭ-um ; Bed-do′-mĕ-i (Beddome's), *Baker.*

This is the *Goniophlebium molle* of Beddome, a stove species, native of Burmah, where it was discovered by the Rev. C. S. Parish. It is distinct through its wide-creeping rhizome, densely clothed with reddish-brown scales, from which the fronds, 1½ft. long and 7in. to 8in. broad, are produced. The leaflets, 3in. to 4in. long and ½in. broad, are deeply notched, sometimes eared at the base on the upper side, stalkless, of a soft, papery texture, and with spore masses disposed in a single row.—*Hooker*, *Synopsis Filicum*, p. 344. *Beddome*, *Ferns of British India*, t. 206.

P. Bernouillii—Ber-nouil′-lĭ-i (Bernouilli's), *Baker.*

A stove species, of small dimensions and little decorative value, much resembling the better-known *P. plebeium.* It is a native of Guatemala.—*Hooker*, *Synopsis Filicum*, p. 510.

P. biauriculatum—bi-aur-ic-ul-a′-tum (twice-eared), *Hooker.*

A greenhouse species, native of Peru, with fronds 1ft. to 1½ft. long, 4in. to 6in. broad, and borne on stout, upright stalks 4in. to 6in. long and hairy upwards. The horizontal leaflets, 2in. long and ¼in. broad, are entire, distinctly eared at the base on both sides, of a somewhat leathery texture, and densely hairy on both sides. The sori (spore masses) fill up nearly the whole space between the edge and the midrib.—*Hooker*, *Icones Plantarum*, t. 121.

P. biforme—bif-or′-mĕ (of two forms), *Baker.*

This stove species, native of Madagascar, Bourbon, and Mayotta, has oblong-spear-shaped fronds 2ft. long, borne on stalks 1¼ft. long. They are simply pinnate, being cut to the midrib into many strap-shaped, bluntly-lobed leaflets : the barren ones are 6in. to 7in. long and 1in. broad, while the fertile ones are smaller, and the lowest are stalked ; all are light green on both surfaces, and have the spore masses disposed near the main veins.—*Hooker*, *Synopsis Filicum*, p. 505.

P. (Phymatodes) bifrons—Phy-mat-o′-dēs ; bif′-rons (two-fronded), *Hooker.*

In this stove species, native of Ecuador, the fronds, produced from a rather slender, branched, twisted rhizome of a woody nature, are of two quite

distinct characters. The barren ones, 3in. to 4in. long, 1in. broad, and stalkless, are elliptical, being narrowed at both ends, with blunt lobes, which reach nearly half-way down. The fertile ones, 4in. to 6in. long, are short-stalked, entire, of a soft, papery texture, and naked on both sides. The large, oblong sori (spore masses) are placed end to end in a row on each side close to the midrib.—*Hooker*, *Species Filicum*, v., p. 78; *Filices Exoticæ*, t. 52. *Nicholson*, *Dictionary of Gardening*, iii., p. 187.

P. bifurcatum—bif-ur-ca′-tum (twice-forked). A synonym of *P. Lobbianum*.

P. (Phymatodes) Billardieri—Phy-mat-o′-dēs; Bil-lar-dī-e′-ri (Labillardière's), *R. Brown*.

This very useful and highly ornamental, greenhouse species, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1824, by Allan Cunningham, is a native of New Zealand, Australia, Tasmania, and the neighbouring islands. It is a very handsome Fern, provided with wide-creeping rhizomes of a woody nature, densely clothed with dark-coloured and glossy scales, from which the fronds are produced. These fronds usually stand upright and are borne on firm, erect, glossy stalks 4in. to 8in. long; they vary in shape from oblong-spear-shaped and quite entire, to 1½ft. long and half as broad and deeply pinnatifid (cut nearly down to the midrib). In young or freshly-divided plants the simple fronds predominate, whilst in old-established ones they are nearly all pinnatifid, being composed of narrow-spear-shaped leaflets of a leathery texture, deep green in colour, and naked on both sides. The large, round sori (spore masses) are disposed in single rows close to the midvein, and are so distinctly immersed in the frond as to form protuberances on the upper side.—*Hooker*, *Species Filicum*, v., p. 82. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Ferns British and Exotic*, i., t. 47.

This species is a particularly shallow-rooting plant; it flourishes best in a flower-pan, in a mixture in which fibrous peat predominates.

P. (Phegopteris) biseriale—Phe-gop′-ter-is; bis-er-ĭ-a′-lĕ (in two series), *Baker*.

A strong-growing, stove species, native of the Andes of Peru and Ecuador, with much-divided fronds 2ft. to 3ft. long, 1ft. or more in breadth,

borne on slightly-scaly stalks 1ft. to 2ft. long. The lowest leaflets, 6in. to 8in. long and 2in. to 3in. broad, are cut down to the rachis below into distinct, oblong-spear-shaped leafits, which are subdivided into lobes of a thin, papery texture. The spore masses are disposed in pairs on the lower lobes.—*Hooker*, *Synopsis Filicum*, p. 309.

P. biserratum—bis-er-ra′-tum (twice-serrated). A form of *P. subpetiolatum.*

P. (Grammitis) bisulcatum — Gram-mi′-tis ; bis-ul-ca′-tum (twice-furrowed), *Hooker.*

A very uncommon and singular, stove species, native of Borneo, and more interesting as a botanical curiosity than useful as a decorative plant. Its fronds, produced from a wide-creeping rhizome, are 6in. to 9in. long, resemble the stem of a rush, and show five furrows, of which the two deepest bear the closely-set, prominent oval spore masses. This plant is the *Holcosorus pentagonus* of Moore. — *Hooker*, *Species Filicum*, iv., p. 164 ; *Second Century of Ferns*, t. 98.

P. blechnoides—blēch-nŏ-i′-des (Blechnum-like), *Hooker.*

This greenhouse species, native of Polynesia and Queensland, is distinct on account of the fertile leaflets being confined to the upper half of the fronds, which are produced from a stout rhizome clothed with dense, narrow scales, and borne on rigid, upright, naked stalks 2in. to 3in. long. The whole frond seldom measures more than 1ft. long and 1½in. broad ; it is cut down very nearly to the rachis throughout. The fertile leaflets are longer and narrower than the barren ones, which are bluntish, growing gradually shorter and broader downwards ; all are of a leathery texture. The oblong spore masses, deeply immersed in the fronds, are disposed in rows near the midrib.—*Hooker*, *Species Filicum*, iv., p. 180.

P. Boivini—Boi-vi′-ni (Boivin's), *Mettenius.*

A very small-growing, stove species, of botanical interest only, native of Madagascar.—*Hooker*, *Synopsis Filicum*, p. 507.

P. (Phegopteris) Bojeri—Phe-gop′-ter-is ; Bo′-jer-i (Bojer's), *Hooker.*

This stove species, of medium dimensions, is a native of Mauritius and Bourbon Islands. Its much-divided fronds, 2ft. or more in length and 1ft.



Hymenophyllum pulcherrimum

(½ nat. size).

to 1½ft. broad, have their spear-shaped leaflets, 6in. to 10in. long and 2in. broad, again divided into spear-shaped leafits, which are cut down nearly to the rachis below into close, entire, blunt lobes, the whole being of a thin, papery texture. The sori (spore masses) are small, abundant, and disposed close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 251.

P. (Niphobolus) Boothii—Niph-ob′-ol-us ; Boo′-thĭ-i (Booth's), *Hooker*.

A very robust, stove species, native of Bhotan, with fronds 1½ft. to 2ft. long, 3in. to 4in. broad, borne on firm, upright stalks 1ft. or more in length and scaly at the base. These fronds are gradually narrowed towards both ends and have their edge entire ; they are smooth on the upper surface, whereas their under-side is thickly covered with a woolly substance of a rusty-brown colour. The spore masses are disposed in two irregular rows.—*Hooker*, *Species Filicum*, v., p. 53. *Beddome*, *Ferns of British India*, t. 258.

P. (Goniopteris) borneense — Go-nĭ-op′-ter-is ; bor-ne-en′-sĕ (Bornean), *Hooker*.

A small, stove species, of little decorative value, native of Borneo.—*Hooker*, *Species Filicum*, v., p. 11.

P. (Goniophlebium) brasiliense — Go-nĭ-oph-leb′-ĭ-um ; bras-il-ĭ-en′-sĕ (Brazilian), *Poiret*.

This stove species, also known under the name of *P. neriifolium*, is a native of the West Indies, Mexico, Brazil, and Peru. Its fronds, 1ft. to 3ft. long, 1ft. or more in breadth, and borne on firm, glossy stalks 6in. to 12in. long, are produced from a stout rhizome densely clothed with spear-shaped scales of a peculiar grey colour. They consist of an entire or slightly sinuated terminal leaflet 4in. to 8in. long and ½in. to 1½in. broad, and of numerous lateral ones of a similar nature, but slightly narrowed at the base, where they are attached to the midrib (Fig. 37), except the lowest, which are sometimes stalked. The texture is leathery, and the spore masses, disposed in one or two series between the midrib and the edge, are immersed in the frond.—*Hooker*, *Species Filicum*, v., p. 28. *Nicholson*, *Dictionary of Gardening*, iii., p. 187.



Fig. 37. Pinna of Polypodium brasiliense (½ nat. size).

P. (Dictyopteris) Brongniartii — Dic-tŷ-op′-ter-is ; Brong-nĭ-ar′-tĭ-i (Brongniart's), *Bory.*

A strong-growing, stove species, native of Malaysia and the Philippine Islands. In habit it is similar to the better-known *P. difforme;* but it is distinguished by its small spore masses being confined to the margin of the lobes.—*Hooker*, *Species Filicum*, v., p 103.

P. (Phymatodes) Brownii — Phy-mat-o′-dēs ; Brown′-ĭ-i (Brown's), *Sprengel.*

This evergreen, greenhouse species, of small dimensions, native of Australia, is said by Lowe, who describes it under the name of *P. attenuatum*, to have been introduced into England in 1823, and into the Royal Gardens, Kew, in 1828, by Allan Cunningham. It is a very interesting plant, with simple (undivided) fronds of a dark green colour and of a very leathery texture, produced from a wide-creeping rhizome of a woody nature, and clothed with spear-shaped scales of a dull brown colour. These fronds are 6in. to 18in. long, ¼in. to ½in. broad, strap-shaped, bluntish at their summit, the lower part being very gradually narrowed to a base or short stem. The large and prominent sori (spore masses) are oblong in shape, and disposed in a single row end to end a space from one another midway between the midrib and the edge, on the upper portion of the frond, in which they are immersed.—*Hooker*, *Species Filicum*, v., p. 58 ; *Garden Ferns*, t. 30. *Nicholson*, *Dictionary of Gardening*, iii., p. 187. *Lowe*, *Ferns British and Exotic*, ii., t. 29A.

P. (Phegopteris) cæspitosum—Phe-gop′-ter-is ; cæs-pit-o′-sum (tufted), *Baker.*

A greenhouse species, of small dimensions and of little decorative value. It is a native of Mexico.—*Hooker*, *Synopsis Filicum*, p. 305.

P. (Phegopteris) calcareum—Phe-gop′-ter-is ; cal-ca′-rĕ-um (Limestone Polypody). Synonymous with *P. Robertianum.*

P. (Goniophlebium) californicum — Go-nĭ-oph-leb′-ĭ-um ; cal-if-or′-nic-um (Californian), *Kaulfuss.*

This greenhouse species has a somewhat limited habitat in North America, as Eaton states that "it is apparently confined to the region west of the coast

range of mountains and to the islands lying off the shore." In general habit it is very like the common Polypody (*P. vulgare*); its fronds, 6in. to 9in. long, 3in. to 5in. broad, and borne on firm, erect, naked stalks 3in. to 6in. long, are produced from a wide-creeping rhizome clothed with spear-shaped scales of a rusty-brown colour. They are cut down nearly or quite to the midrib into finely-toothed leaflets 1½in. to 2½in. long, of a soft, papery texture. The large and prominent spore masses are disposed in single rows near the midrib.—*Hooker*, *Species Filicum*, v., p. 18. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Eaton*, *Ferns of North America*, i., t. 31.

P. (Dictyopteris) cameroonianum—Dic-tŷ-op′-ter-is; cam-er-oo-nĭ-a′-num (native of the Cameroons), *Hooker*.

A very robust-growing, greenhouse species, native of the Cameroon Mountains, with fronds 3ft. to 4ft. long, 2ft. broad, and borne on glossy stalks 4ft. long. The upper part of these fronds is divided nearly to the midrib into spear-shaped lobes; the lower leaflets, in the shape of the Greek delta, Δ, are sometimes more than 1ft. long, 6in. to 8in. broad, and cut down below nearly to the rachis into pinnatifid, spear-shaped lobes of a soft, papery texture and naked on both sides. The spore masses are disposed in rows near the main veins.—*Hooker*, *Species Filicum*, v., p. 104. *Nicholson*, *Dictionary of Gardening*, iii., p. 188.

P. capillare—cap-il-la′-rĕ (hair-like), *Desvaux*.

The habitat of this stove species extends from the West Indies to Peru. Its fronds, 1ft. long and 2in. broad, of a flaccid nature and pendent habit, are borne on tufted, short, slender stalks of a wiry nature. The leaflets, 1in. to 2in. long, are either entire or lobed, and of a soft, papery texture. The copious spore masses are disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 231, t. 279.

P. (Phymatodes) capitellatum—Phy-mat-o′-dēs; cap-it-el-la′-tum (small-headed). Synonymous with *P. juglandifolium*.

P. (Phegopteris) Carrii—Phe-gop′-ter-is; Car′-rĭ-i (Lieut. Carr's), *Baker*.

This stove species, with simply-pinnate, oblong-spear-shaped fronds 1ft. to 2ft. long, borne on straw-coloured stalks 6in. to 12in. long, is a native of Rio

Janeiro. The strap-shaped leaflets, 4in. to 6in. long, ¾in. to 1in. broad, and bluntly lobed, are short-stalked at the lower part of the frond; they are unequal at the base, the lower side being more wedge-shaped. The fronds are of a moderately firm texture, bright green and smooth on both surfaces, with the midribs below rather scaly; their sori (spore masses) are disposed near the main veins.—*Hooker*, *Synopsis Filicum*, p. 305.

P. (Goniophlebium) Catharinæ—Go-nĭ-oph-leb′-ĭ-um; Cath-ar-ĭ′-næ (St. Catharine's), *Langsdorff and Fischer.*

This easily-cultivated, evergreen, stove species, of medium dimensions, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841, is a native of Brazil. Its simply-pinnate fronds, 6in. to 12in. long and 3in. to 5in. broad, are produced from a wide-creeping rhizome clothed with dark brown, spreading scales, and borne on erect, naked stalks 4in. to 6in. long and of a glossy nature. The texture of their leaflets, which are 1½in. to 3in. long and ¼in. to ½in. broad, is somewhat leathery, and their colour is dark, dull green. The large, round sori (spore masses) are disposed in single rows close to the midrib. *P. Catherinæ* of gardens is synonymous with *P. loriceum latipes.—Hooker*, *Species Filicum*, v., p. 20. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Lowe*, *Ferns British and Exotic*, i., t. 44.

P. (Phegopteris) caudatum — Phe-gop′-ter-is; cau-da′-tum (tailed), *Kaulfuss.*

This is a strong-growing, stove species, native of Cuba and Brazil. Its ample, much-divided fronds, 2ft. to 3ft. long, 1ft. to 1¼ft. broad, borne on firm, angular, brownish stalks 1ft. to 1½ft. long, are furnished with leaflets 6in. to 9in. long, 1in. to 2in. broad, of a soft, papery texture, and naked on both surfaces. These leaflets are cut down to a distinctly-winged rachis (stalk of the leafy portion) into oblong-sickle-shaped, distinctly-toothed lobes of about equal size throughout. The sori (spore masses) are disposed close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 241.

P. (Goniophlebium) caudiceps — Go-nĭ-oph-leb′-ĭ-um; cau′-dic-eps (tail-headed), *Baker.*

A stove species, of small dimensions, native of Formosa, with simple (undivided), smooth, oblong-spear-shaped fronds 6in. long, 1in. or more in

breadth, tapering below to a narrow wing, their extremity being drawn out into a narrow, attenuated point or tail, from which character the specific name is derived. These fronds, produced from a long, slender, creeping rhizome, are borne on stalks 2in. to 4in. long and of a slender nature. The round, naked sori (spore masses) are produced on the lowest veinlet.—*Nicholson, Dictionary of Gardening*, iv., p. 592.

P. (Goniophlebium) chnoodes — Go-nĭ-oph-leb′-ĭ-um ; chno-o′-des (resembling down or wool), *Sprengel.*

A stove species, of elegant, drooping habit, native of the West Indies and Venezuela, and very useful for growing in hanging baskets. According to Lowe, who describes it under the name of *P. dissimile*, this species was introduced into England in the year 1820. Its drooping fronds, 1ft. to 2ft. long and 4in. to 9in. broad, are cut down to the rachis (stalk of the leafy portion) into distinct, sickle-shaped, opposite leaflets 2in. to 4in. long, ½in. to ¾in. broad, heart-shaped at the base, of a soft, papery texture, light green in colour, and finely hairy on both surfaces. They are produced from a stout rhizome densely clothed with soft, spreading scales of a dull brown colour, and borne on erect, slender, naked stalks 4in. to 6in. long. The spore masses are disposed in two series on each side of the main veins. See Coloured Plate. —*Hooker, Species Filicum*, v., p. 25. *Lowe, Ferns British and Exotic*, ii., t. 35.

P. chrysolepis—chry-sol′-ep-is (having golden scales), *Hooker.*

Although of small dimensions and of little decorative value, this pretty little, stove species, native of the Andes of Quito, is very interesting. Its entire (undivided) fronds, 2in. to 3in. long and ½in. broad, terminate in a sharp point, but their lower part is very gradually narrowed ; they are produced from a wide-creeping rhizome, densely clothed with rough scales of a reddish-brown colour, and borne on stalks about 1in. long and scaly. The texture is thick and leathery, and both surfaces are clothed with small, pale-coloured scales attached by the centre of the disk. The large, round sori (spore masses) are disposed in rows nearer the midrib than the edge.—*Hooker, Species Filicum*, iv., p. 173 ; *Icones Plantarum*, t. 721.

P. (Goniophlebium) ciliatum — Go-nĭ-oph-leb′-ĭ-um ; cil-ĭ-a′-tum (ciliated). A variety of *P. piloselloides.*

P. (Goniophlebium) colpodes — Go-nĭ-oph-leb′-ĭ-um ; col-po′-dēs (embosomed). This is synonymous with *P. plesiosorum.*

P. concinnum—con-cin′-num (pretty). A synonym of *P. lanigerum.*

P. (Niphobolus) confluens — Niph-ob′-ol-us ; con′-flŭ-ens (cohering), *R. Brown.*

A singular, greenhouse species, of very small dimensions, native of Temperate Eastern Australia, with fronds of two totally different characters, produced from a wide-creeping, thread-like rhizome. The barren ones are roundish or oblong ; the fertile ones are longer and narrower, seldom more than 1in. long and ¼in. broad, with the edge quite entire. Both kinds are of a leathery texture, naked on their upper surface, but densely clothed on their under-side with a reddish-brown, woolly substance. The sori (spore masses), though immersed, are prominent and sometimes cover the whole under-surface of the frond. There is another plant of totally different habit, known in commerce under the name of *P. confluens* of Fée ; this is synonymous with *P. apiculatum.—Hooker*, *Species Filicum*, v., p. 46.

P. (Drynaria) conjugatum — Dryn-a′-rĭ-a ; con-jug-a′-tum (mixed), *Lamarck.*

This very handsome, stove species, which is the *P. coronans* of Wallich, is a native of Northern India (according to Beddome, it occurs in Nepaul, Kumaon, Assam, Sikkim, Khasya, Mishmee, and Moulmein), Hong-Kong, &c. It must not be confounded with *P. coronans* of gardens, which is *P. Heracleum* of Kunze, a totally different plant. The handsome fronds, which are arranged in a circle and produced from a very thick rhizome densely matted with narrow, bright brown scales, are 2ft. to 4ft. long and 1ft. to 1½ft. broad. Their stalk is furnished with a lobed wing 2in. to 4in. broad on each side at the base ; this is narrowed and more deeply lobed upwards, gradually passing into the frond, which is cut down nearly to the rachis throughout into entire leaflets 4in. to 8in. long, 1in. to 1½in. broad, of a rigid texture, and naked on both sides. The sori (spore masses) are disposed in a single row close to the anterior main vein, and are sometimes confluent.—*Hooker*, *Species Filicum*, v., p. 95 ; *Filices Exoticæ*, t. 91. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Beddome*, *Ferns of British India*, t. 13.

P. (Phegopteris) connexum—Phe-gop′-ter-is ; con-nex′-um (connecting), *Kaulfuss.*

A stove species, of large dimensions, native of Brazil, with tripinnatifid fronds in shape of the Greek delta, Δ, 3ft. to 4ft. or more in length, 2ft. or more in breadth, and borne on firm, naked stalks 3ft. to 4ft. long. The lower leaflets, broadly spear-shaped and 8in. to 12in. long, are furnished with leafits 3in. to 4in. long, ¾in. broad, cut down nearly to the rachis (stalk of the leafy portion) into oblong, entire or slightly notched lobes about ¼in. broad. They are of a soft, papery texture and naked on both sides. The spore masses are disposed one row each side of the main veins.—*Hooker*, *Species Filicum*, iv., p. 261.

P. (Goniophlebium) cordatum — Go-nĭ-oph-leb′-ĭ-um ; cor-da′-tum (heart-shaped), *Kunze.*

The fronds of this stove species, native of Peru, are produced from a stout, scaly rhizome, and borne on strong and quite naked stalks 1ft. or more in length. They are simply pinnate (only once divided to the midrib), 1½ft. to 2ft. long, 8in. to 10in. broad, and furnished with leaflets 4in. to 5in. long, about 1in. broad, sharp-pointed at the extremity, heart-shaped at the base, with the edge entire, and of a leathery texture. The spore masses, disposed in one or two rows, are immersed in the frond.—*Hooker*, *Synopsis Filicum*, p. 345.

P. (Drynaria) coronans—Dryn-a′-rĭ-a ; cor-o′-nans (crowned). This is synonymous with *P. conjugatum*. *P. coronans* of gardens is identical with *P. Heracleum.*

P. (Goniopteris) costatum—Go-nĭ-op′-ter-is ; cos-ta′-tum (ribbed), *Hooker.*

A robust-growing, stove species, native of the Society Islands and Fiji, with fronds 3ft. to 4ft. long, 1ft. or more in breadth, borne on stalks 1ft. or more in length, strong, brownish, and of a glossy nature. The fronds are furnished with numerous leaflets 8in. to 10in. long, 1¼in. to 1½in. broad, cut down two-thirds of the way to the midrib into nearly entire, bluntish lobes, with a space between them ; they are of a somewhat leathery texture, and the spore masses are disposed close to the main vein.—*Hooker*, *Species Filicum*, v., p. 7.

P. (Phymatodes) crassifolium—Phy-mat-o′-dēs ; cras-sif-ol′-ĭ-um (thick-leaved), *Linnæus.*

The range of habitat of this singular-looking, stove species extends from the West Indies and Mexico to Brazil and Peru, where it is said to be common. Its simple (undivided) fronds, 1ft. to 3ft. long, 1in. to 5in. broad, gradually narrowed to both ends, and with the edge entire, are borne on strong, upright stalks 2in. to 6in. long, and produced from a short-creeping rhizome of a woody nature, clothed with egg-shaped scales of a dull brown colour They are of a very leathery texture, and their upper surface shows a few scattered, small, white dots. The spore masses are disposed in single rows between the main veins.—*Hooker*, *Species Filicum*, v., p. 62. *Nicholson*, *Dictionary of Gardening*, iii., p. 188.

P. c. albo-punctatissimum — al-bo–punc-ta-tis′-sim-um (much dotted with white), *J. Smith.*

This form of the above species, which is very variable, was, according to Lowe, introduced into the Royal Gardens, Kew, in 1842. It is readily distinguished from the species through the glaucous colour of its fronds, the upper surface of which is covered with small, white dots.—*Lowe*, *Ferns British and Exotic*, i., t. 36.

P. crassifrons—cras′-sif-rons (thick-fronded), *Baker.*

A small-growing, stove species, of little decorative value, with undivided fronds barely 6in. long, ½in. broad, and of a very thick texture. It is a native of New Caledonia.—*Hooker*, *Synopsis Filicum*, p. 325.

P. (Phymatodes) crassinervium—Phy-mat-o′-dēs ; cras-sin-er′-vĭ-um (thickly-nerved). This is synonymous with *P. platyphyllum.*

P. (Goniopteris) crenatum — Go-nĭ-op′-ter-is ; cre-na′-tum (scalloped), *Swartz.*

This very handsome, stove species, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1835, is a native of the West Indies, St. Domingo, Martinique, &c. Its simply-pinnate fronds, of an evergreen nature, and borne on erect, naked or slightly hairy stalks 1ft. to 2ft. long, are 1ft. to 2ft. long, 1ft. or more in breadth, and composed of an oblong-

spear-shaped terminal leaflet 6in. to 8in. long and 1½in. to 2in. broad, with the edge either entire or a little bluntly lobed, and from two to four opposite pairs of similar lateral ones, all of a soft, papery texture and pale green colour. The abundant and very conspicuous sori (spore masses) are disposed in rows near the main veins.—*Hooker*, *Species Filicum*, v., p. 2. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Lowe*, *Ferns British and Exotic*, i., t. 26B.

P. (Phegopteris) crinale—Phe-gop′-ter-is ; cri-na′-lĕ (hairy), *Hooker and Arnott.*

A stove species, of somewhat large dimensions, native of the Sandwich Islands, with ample and much-divided fronds, borne on tufted, stout stalks densely clothed with rough scales of a hairy nature. They are usually from 2ft. to 3ft. long, 1ft. or more in breadth, with broadly spear-shaped leaflets and blunt leafits 1½in. to 2in. long, again cut into rounded, blunt lobes, the lower ones reaching down to the midrib. The fronds are of a leathery texture, and the sori (spore masses) are disposed one to each lobe and situated near the upper edge.—*Hooker*, *Species Filicum*, iv., p. 266.

P. (Phymatodes) crispatum — Phy-mat-o′-dēs ; cris-pa′-tum (curled), *Hooker.*

This is a pretty, stove species, native of Panama. Its nearly entire, strap-shaped fronds, bluntly lobed a quarter or sometimes even half-way to the midrib, of a pendent habit and somewhat leathery texture, thinly clothed on both sides with soft hairs, are 6in. to 18in. long and ½in. to ¾in. broad ; they are borne on tufted, slender stalks 1in. to 2in. long and clothed with hairs of the same nature as those of the fronds. The small sori (spore masses) are quite immersed in the frond, being disposed from two to six to each lobe.—*Hooker*, *Species Filicum*, v., p. 1.

P. (Phegopteris) cubanum—Phe-gop′-ter-is ; cub-a′-num (Cuban), *Baker.*

A small, stove species, native of Cuba, of little decorative value, closely related to *P. reptans.*—*Hooker*, *Species Filicum*, iv., p. 233.

P. cultratum—cul-tra′-tum (knife-like), *Willdenow.*

A stove species, with fronds of a flaccid nature and pendulous habit, 6in. to 18in. long, ½in. to 1in. broad, cut down to the rachis into close, horizontal

or decurved, blunt leaflets of a soft, papery texture. These fronds are borne on short, tufted, slender stalks, clothed with soft, brown hairs. The sori (spore masses) are disposed in a row on each side of and close to the midvein. The habitat of this species extends from Cuba and Guatemala to Brazil and Peru; it is also found in the Mauritius and at Fernando Po.—*Hooker*, *Species Filicum*, iv., p. 190.

P. (Dictyopteris) Cumingianum—Dic-tŷ-op′-ter-is; Cum-ing-ĭ-a′-num (Cuming's). Synonymous with *P. macrodon.*

P. (Niphobolus) cuneatum — Niph-ob′-ol-us; cun-ĕ-a′-tum (wedge-shaped), *Kuhn.*

This is a stove species, of very small dimensions and little decorative value, with barren and fertile fronds totally different in shape, produced from a slender rhizome, and of a leathery texture. It is a native of Ecuador.—*Hooker*, *Synopsis Filicum*, p. 513.

P. (Phymatodes) Cunninghami — Phy-mat-o′-dēs; Cun-ning-ham′-i (Cunningham's), *Hooker.*

A greenhouse species, of medium dimensions, native of New Zealand and the New Hebrides, producing from a short-creeping rhizome clothed with large, spear-shaped scales of a dull brown colour its simple (undivided) fronds 6in. to 12in. long and about ¾in. broad. These fronds are of a leathery texture, yet not rigid, and naked on both surfaces; they are sharp-pointed at their extremity, their edge is entire, and their widest part about half-way down, from which they are gradually narrowed to the base or a short stalk. The large and prominent sori (spore masses) are not immersed, either roundish or oblong, and disposed in a row nearer the midrib than the edge.—*Hooker*, *Species Filicum*, v., p. 58; *Icones Plantarum*, t. 409.

P. curvatum—cur-va′-tum (curved), *Swartz.*

A stove species, of medium size, native of Jamaica, Ecuador, and Peru, producing from a stout, scaly rhizome fronds 1ft. to 1½ft. long, 2in. to 3in. broad, and borne on dark brown stalks 3in. to 4in. long and of a naked, glossy nature. The fronds, of a pendent habit, are cut down to the curved and flexuous rachis (stalk of the leafy portion) into close, narrow, notched leaflets

of a somewhat leathery texture and naked on both sides. The sori (spore masses), of a bright yellow colour, are disposed in two long rows, one on each side of the midvein.—*Hooker*, *Species Filicum*, iv., p. 201. *Nicholson*, *Dictionary of Gardening*, iii., p. 188.

P. (Goniophlebium) cuspidatum—Go-nĭ-oph-leb′-ĭ-um ; cus-pid-a′-tum (pointed). This is synonymous with *P. persicæfolium*.

P. (Phegopteris) cyatheæfolium—Phe-gop′-ter-is ; cy̆-ath′-ĕ-æ-fol′-ĭ-um (Cyathea-fronded), *Desvaux*.

With this stove species, native of Mauritius and Bourbon Island, *P. Sieberianum* is synonymous. Its ample fronds, 1½ft. to 2ft. long, 1ft. or more in breadth, and borne on firm, naked stalks 1½ft. to 2ft. long, have their leaflets 6in. to 9in. long, 2in. or more in breadth, and cut down to a broadly-winged rachis into sickle-shaped, entire lobes, the lowest pair being rather smaller and deflexed. They are of a soft, papery texture, and the spore masses are disposed about the centre of the lobes.—*Hooker*, *Species Filicum*, iv., p. 235. *Nicholson*, *Dictionary of Gardening*, iii., p. 188.

P. dareæforme—da′-rĕ-æ-for′-mĕ (Darea-shaped), *Hooker*.

A greenhouse species, with finely-cut foliage, native of Sikkim, Khasya, and Moulmein. Its somewhat triangular fronds, 1ft. to 1½ft. long, 8in. to 12in. broad, and borne on naked stalks 6in. to 9in. long and of a glossy nature, are produced from a stout, wide-creeping rhizome clothed with dense, narrow scales of a pale brown colour. The lower leaflets, 4in. to 6in. long and 1½in. to 2in. broad, are broadly spear-shaped and furnished with oblong-spear-shaped leafits, which are again divided into either entire or forked segments of a soft, papery texture and naked on both sides. The sori (spore masses) are disposed at the extremity of the veins, one of which is found in each segment.—*Hooker*, *Species Filicum*, iv., p. 256 ; *Second Century of Ferns*, t. 24. *Beddome*, *Ferns of British India*, t. 174.

P. decorum—dec-o′-rum (decorous), *Brackenridge*.

A stove species, of small dimensions and of little decorative value, with fronds 6in. to 12in. long, barely 1in. broad, simply pinnate, and of a leathery texture. It is a native of Ceylon, Malaysia, the Philippine Islands,

Tahiti, and the Sandwich Islands.—*Hooker*, *Species Filicum*, iv., p. 179. *Beddome*, *Ferns of Southern India*, t. 238.

P. (Phlebodium) decumanum—Phleb-o′-dĭ-um ; dec-um-a′-num (large), *Willdenow.*

This stove species, of large dimensions, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841, is closely allied to the popular *P. aureum*, and is also known as *P. dictyocallis.* It is a native of New Granada, Brazil, and Peru. The fronds, narrower and slenderer than those of that popular species, are produced from a stout rhizome densely clothed with soft, bright brownish scales, and borne on stout, upright stalks 1ft. to 2ft. long and of a glossy nature. The fronds themselves, 1ft. to 3ft. long and 1ft. to 2ft. broad, are cut down nearly, or below quite, to the rachis (stalk of the leafy portion) into nearly entire, strap-shaped leaflets often 1ft. long, 2in. to 3in. broad, of a soft, papery texture and pale green colour, and beautifully veined. The sori (spore masses) are disposed in one row on each side of the midvein and immersed in the frond.—*Hooker*, *Species Filicum*, v., p. 17. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Lowe*, *Ferns British and Exotic*, ii., t. 14.

P. (Campyloneuron) decurrens — Camp-yl-on-eur′-on ; de-cur′-rens (decurrent, attached to the stalk), *Raddi.*

This interesting, stove Fern, of large dimensions, native of Brazil and Peru, is a striking object on account of the distinct and prominent marking of the veins of its fronds. According to Lowe, it was introduced into the Royal Gardens, Kew, in 1841. Its fronds, of a somewhat erect habit and borne on firm, naked stalks 6in. to 12in. long, are produced from rather slender rhizomes of a wiry nature. They are 2ft. to 3ft. long, 1½ft. to 2ft. broad, and furnished with sharp-pointed, spear-shaped leaflets 8in. to 12in. long, narrowed at the base, where they run along the rachis ; these leaflets are of a somewhat leathery texture, of a dark green colour, and have nearly entire edges. The sori (spore masses), of a peculiar pale straw-colour, are disposed midway between the midrib and the edge.—*Hooker*, *Species Filicum*, v., p. 42. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Lowe*, *Ferns British and Exotic*, ii., t. 4.

P. (Phegopteris) decussatum — Phe-gop′-ter-is ; dec-us-sa′-tum (cross-leaved), *Linnæus.*

A very robust-growing, stove species, native of the West Indies, Peru, and Brazil, with fronds 3ft. to 4ft. long, 1ft. to 1½ft. broad, borne on stout, erect stalks 2ft. to 3ft. long, scaly towards the base, polished upwards, sometimes slightly rough with short points. They are furnished with leaflets 8in. to 12in. long, 1in. to 1½in. broad, cut down nearly or quite to the rachis into close, spreading, entire lobes, showing a distinct gland at the base beneath. The substance of the frond is thin, and densely but minutely pubescent. The abundant and very minute sori (spore masses) are disposed in rows near the midrib.—*Hooker*, *Species Filicum*, iv., p. 244. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Lowe*, *Ferns British and Exotic*, ii., t. 54.

P. (Phegopteris) deflexum—Phe-gop′-ter-is ; de-flex′-um (bent down), *Baker.*

This stove species, of medium dimensions, native of New Granada, was, according to Lowe, introduced into England in 1830. It is a plant of graceful habit, with fronds 8in. to 12in. long, 2in. broad, borne on naked, slender stalks 2in. to 3in. long. They are furnished with sharp-pointed, spear-shaped leaflets, the lower ones bent down, very distant, and dwindling to mere auricles ; these are of a soft texture and of a heavy, dull green colour. The prominent, pale-coloured sori (spore masses) are disposed nearer the midrib than the edge.—*Hooker*, *Synopsis Filicum*, p. 305. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Lowe*, *Ferns British and Exotic*, i., t. 45.

P. delicatulum—de-lic-a′-tul-um (somewhat delicate), *Mertens and Galeotti.*

A small-growing, stove species, native of Mexico and Ecuador, with pinnate fronds 4in. to 6in. long, barely ½in. broad, produced from a wide-creeping rhizome, and borne on tufted, wiry stalks 1in. to 2in. long and densely clothed with long, soft hairs. The abundant sori (spore masses) are disposed six to eight to a leaflet, in which they are partly immersed.—*Hooker*, *Species Filicum*, iv., p. 184.

P. dependens—de-pen′-dens (hanging down), *Baker.*

This stove species, native of the Andes of Ecuador, has fronds of a pendent habit and flaccid texture, 2ft. or more in length, barely ¾in. broad, borne on

short, tufted, thread-like stalks clothed with soft, spreading hairs. The broadly-oblong, blunt, entire leaflets are of a soft, papery texture and slightly hairy on both sides; they are alternate (not opposite) and about ¼in. apart in the centre of the frond. The spore masses are disposed close to the midrib.—*Hooker*, *Synopsis Filicum*, p. 335.

P. (Grammitis) Deplanchei—Gram-mi′-tis; Dep-lanch′-ĕ-i (Deplanche's), *Baker*.

A stove species, of small dimensions, native of New Caledonia, producing from a stout rhizome densely clothed with stiff, dark brown scales its stalkless fronds, 6in. to 9in. long, ½in. broad, gradually narrowed to both ends, with the edge entire or with a few conspicuous blunt teeth about the middle; they are of a very leathery texture and naked on both sides. The oblong, oblique, immersed sori (spore masses) are disposed in close rows in the upper half of the frond near the edge.—*Hooker*, *Synopsis Filicum*, p. 322.

P. (Phegopteris) Dianæ — Phe-gop′-ter-is; Di-a′-næ (Diana's). A garden synonym of *P. molle*.

P. (Phlebodium) dictyocallis—Phleb-o′-dĭ-um; dic-tў-oc-al′-lis (beautifully netted). This is synonymous with *P. decumanum*.

P. (Dictyopteris) difforme — Dic-tў-op′-ter-is; dif-for′-mĕ (deformed), *Blume*.

This strong-growing, stove species, which is better known in gardens under the name of *P. irregulare*, is a native of Malaysia, &c. Its ample fronds, 3ft. to 4ft. long and borne on tufted, erect stalks 1ft. or more in length, are furnished with spear-shaped leaflets or with broad, blunt or sickle-shaped lobes reaching half-way down to the rachis (stalk of the leafy portion); the lower ones are often deltoid (in shape of the Greek delta, Δ), several inches long, with their lower side prolonged and deeply cleft; all are of a somewhat leathery texture, naked on both sides. The very abundant sori (spore masses) are irregularly scattered.—*Hooker*, *Species Filicum*, v., p. 101. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Beddome*, *Ferns of Southern India*, t. 118.

P. (Phymatodes) dilatatum—Phy-mat-o′-dēs ; di-la-ta′-tum (enlarged), *Wallich.*

A strong-growing, greenhouse species, native of Khasya, where, according to Beddome, it is found at elevations varying between 4000ft. and 6000ft. ; also of Malaysia, Moulmein, Samoa, &c. Its fronds, produced from a thick rhizome of a woody nature, and clothed with large, egg-shaped scales of a dull brown colour, are borne on stalks 1ft. long, with a narrow, decurrent wing reaching nearly down to the base. They are 1½ft. to 3ft. long, 1ft. or more in breadth, cut down nearly to the rachis into sharp-pointed, entire lobes 4in. to 8in. long, of a soft, papery texture, and naked on both sides. The small and abundant sori (spore masses) are scattered irregularly, and frequently become confluent.—*Hooker*, *Species Filicum*, v., p. 85. *Nicholson*, *Dictionary of Gardening*, iii., p. 188. *Beddome*, *Ferns of British India*, t. 122.

P. Dipteris—Dip′-ter-is (Dipteris), *Blume.*

A very handsome and distinct, stove species, of robust habit, native of the Moluccas, Polynesia, the Fiji Islands, &c. Although, so far as we are aware, this beautiful plant has not been successfully grown in this country, it has been imported several times, and is well known in the form of dry specimens, under the name of *Dipteris Horsfieldii*. Its singular fronds, produced from a slender rhizome of a wiry nature and borne on strong, wiry stalks 3ft. to 5ft. long, are 1ft. to 3ft. long and much broader, the main lobes reaching three-quarters of the way down and having their edges sharply toothed (Fig. 38 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author). They are of a somewhat leathery texture, dark green on their upper surface, and of a peculiar glaucous or bluish colour underneath. The very small, pale yellow sori (spore masses) are irregularly scattered, but are especially plentiful near the midveins, where they frequently become confluent.—*Hooker*, *Species Filicum*, v., p. 99. *Beddome*, *Ferns of British India*, t. 321.

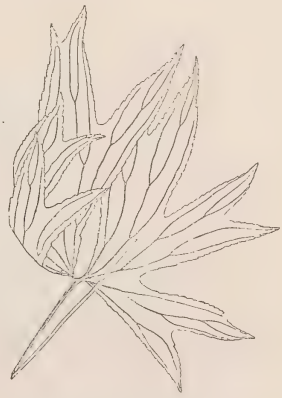


Fig. 38. Frond of Polypodium Dipteris (much reduced).

P. discolor—dis′-col-or (two-coloured), *Hooker*.

A stove species, of small dimensions and of very little decorative value, native of British Guiana. It derives its specific name from the nature of its small fronds, which are green above and clothed with a white, chalky meal underneath.—*Hooker*, *Species Filicum*, iv., p. 189 ; *Icones Plantarum*, t. 4.

P. (Goniophlebium) dissimile — Go-nĭ-oph-leb′-ĭ-um ; dis-sĭm′-il-ĕ (unlike). Synonymous with *P. chnoodes*.

P. (Phegopteris) distans—Phe-gop′-ter-is ; dis′-tans (distant), *Don*.

This strong-growing, greenhouse species has a very wide range of habitat, being a native of Northern India, where it is found at elevations varying between 9000ft. and 10,000ft., and extending to Ceylon and Java. Beddome states that it is plentiful and very common about Ootacamund, on the Neilgherries. Its much-divided fronds, 1½ft. to 3ft. long and 8in. to 12in. or more in width, are borne on slender, glossy stalks 1½ft. to 2ft. long and of a chestnut-brown colour. The lower leaflets, 6in. to 8in. long and 1½in. broad, are cut down nearly or quite to the rachis into deeply-cleft leafits, with either blunt or sharply-toothed, nearly entire lobes enlarged at the base. The fronds are of a soft, papery texture and slightly hairy on their under-side. The very abundant sori (spore masses) are scattered over the whole under-surface of the lobes.—*Hooker*, *Species Filicum*, iv., p. 244. *Beddome*, *Ferns of British India*, t. 39.

Like most other Ferns which have a wide range of habitat, this species is very variable, its size and habit being frequently affected by the different positions in which it is found. The most distinct and permanent form is :

P. d. Griffithii—Grif-fith′-ĭ-i (Griffith's), *Hooker*.

This plant, which, Beddome says, is found in Bhotan, Mishmee, Khasya, &c., is a very good grower, and differs from the species to which it is related principally through the conspicuously undulated character of the edges of its nearly entire lobes.—*Hooker*, *Species Filicum*, iv., p. 236. *Beddome*, *Ferns of British India*, t. 158.

P. divergens—di-ver′-gens (diverging). A synonym of *Nephrodium effusum*.

P. (Goniopteris) diversifolium — Go-nĭ-op′-ter-is ; di-ver-sif-ol′-ĭ-um (various-leaved), *Swartz.*

This stove species, native of Brazil, Caraccas, and Ecuador, must not be confounded with *P. diversifolium* of R. Brown, which is only a synonym of *P. rigidulum.* Its simply-pinnate fronds, 1ft. to 2ft. long, 6in. to 9in. broad, and borne on tufted, slender, naked stalks 1ft. to 2ft. long, are furnished with

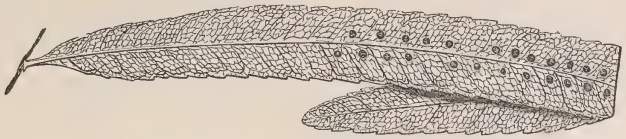


Fig. 39. Pinna of Polypodium diversifolium
(nat. size).

long, narrow leaflets seldom more than 1in. broad, with the edge nearly entire or slightly undulated. They are of a somewhat leathery texture, very prettily veined, and their sori (spore masses) are disposed in a row on each side of and close to the midrib (Fig. 39).—*Hooker*, *Species Filicum*, v., p. 4. *Nicholson*, *Dictionary of Gardening*, iii., p. 189.

P. (Phegopteris) drepanum — Phe-gop′-ter-is ; drep′-an-um (sickle-like), *Hooker.*

A very handsome, greenhouse species, native of Madeira, with fronds 1½ft. to 3ft. long, 8in. to 12in. broad, produced from a short, upright stem, and borne on tufted stalks, which are 1ft. to 1½ft. long and densely clothed with dark-coloured scales at their base. The lowest leaflets, which are also the largest, often measure 8in. in length and 3in. in breadth ; the leafits are spear-shaped, unequal-sided, conspicuously eared on the upper side, and truncate (maimed) on the lower side at the base, with a broad, uncut centre and numerous teeth. The fronds are of a leathery texture, with both sides nearly naked. The very prominent



Fig. 40. Portion of Pinna of Polypodium drepanum
(nat. size).

and abundant sori (spore masses) are disposed irregularly in rows on each side of the midvein and eventually become confluent (Fig. 40).—*Hooker*, *Species Filicum*, iv., p. 249. *Nicholson*, *Dictionary of Gardening*, iii., p. 189. *Lowe*, *Ferns British and Exotic*, ii., t. 34.

P. (Phegopteris) Dryopteris—Phe-gop′-ter-is ; Drў-op′-ter-is (Oak Fern, from the Greek *Drus*, an Oak, and *Pteris*, a Fern), *Linnæus*.

This exceedingly pretty, dwarf-growing, hardy species has a most extensive range of habitat. According to Beddome, it is abundant in Northern India, where it occurs at elevations varying between 5000ft. and 8000ft. ; also in the Western Himalayas, in Manchuria, Japan, &c. Eaton, in "Ferns of North America" (vol. i., p. 158), states that it is found growing plentifully in open, rocky woods in Canada and in the Northern United States, extending to the mountains of Colorado, Oregon, Uńalaska, Labrador, and perhaps Greenland. He adds that it is also found throughout Northern Europe and Asia, from the British Isles to Kamtschatka, and gives as its southern limit in Europe the Pyrenees and Northern Italy, and, in Asia, Thibet and Cashmere.

P. Dryopteris, though not known to Ray in 1670, when he published his "Catalogus Plantarum Angliæ," in which no mention of it is made, was, however, discovered by him near Tintern Abbey before 1685, when he published his "Historia Plantarum," and when the first notice of its being certainly a British Fern is recorded. It is found particularly on shady mountain-sides in Ireland, on the Mourne and Turk Mountains, Mam Turk, at Killarney, Connemara, Tullamore Park, and other mountain districts. It is common in some parts of Scotland, such as Aberdeenshire, Forfarshire, and Perthshire, and is also found, although less abundantly, on the banks of the White Adder, between the Retreat and the Elm Cottage, Berwickshire ; at Moray, in Ross-shire ; at Hawthorndean, near Edinburgh ; and at Langholm and Broomholm, in Eskdale. Notwithstanding the yearly depredations of tourists and Fern hawkers in general, this Fern is still plentiful in some parts of North Wales, and is also frequently met with at Craig Breidden, Montgomeryshire ; near Tintern Abbey, near Llangollen, on a slate rock ; and in Carnarvonshire. In England it is to the present day found at Richmond and about North Bierley, in Yorkshire ; in Cornbury Quarry, in Oxfordshire ;

in Wedwood Forest, near Yoxhall Lodge, Staffordshire ; at High Cliff, Cheshire ; at Boghart Hole Clough and Prestwich Clough, in Lancashire ; in Barrowfield Wood, near Kendal ; near Durham ; in Leigh Woods, near Bristol ; on Frocester Hill, Gloucestershire ; among rocks at the Fall of Lodore, Derwentwater, in Cumberland ; above Langley Ford, near the Cheviot Mountains, and in many other places ; but invariably in perfectly cool, sheltered, moist spots where the temperature is subjected to very little variation during the summer.

Of the four native species of Polypodies with deciduous foliage, *P. Dryopteris* (or, as it is popularly called, "Oak Fern," for which appellation there is no reason, unless it be that it is so named from being frequently found among the moss about the roots of Oak-trees) is undoubtedly the one most generally known and most deservedly appreciated. On account of the peculiarly bright pea-green colour of its fronds, and of its close and compact habit, it is much admired and frequently used for forming in the hardy Fernery edges which, all through the summer, possess a freshness looked for in vain among all other Ferns of dwarf habit. These fronds, produced from a wide-creeping rhizome of a very slender nature, and borne on slender stalks 6in. to 12in. long, naked upwards and slightly scaly below, are deltoid (in shape of the Greek delta, Δ) and generally measure from 6in. to 10in. each way. Their lower leaflets are much the largest (Fig. 41), and the spear-shaped pinnules (leafits) are slightly notched. They are of a soft, papery texture and smooth on both surfaces. The abundant but minute sori (spore masses), of a light brown colour, are scattered over the whole under-side of the frond. A peculiarity noticeable in this species consists in the development of the fronds, the rolled-up leaflets of which, in a young state, resemble three small balls or green peas placed on wires.—*Hooker, Species Filicum*, iv., p. 250 ; *British*



Fig. 41. Polypodium Dryopteris (much reduced).

Ferns, t. 4. *Nicholson*, *Dictionary of Gardening*, iii., p. 189. *Lowe*, *Our Native Ferns*, i., t. 4. *Eaton*, *Ferns of North America*, i., t. 21. *Beddome*, *Ferns of British India*, t. 74. *Druery*, *Choice British Ferns*, p. 117.

In planting the Oak Fern, a spot where moisture and shade can always be depended upon should, if possible, be selected, and a shallow bed made of a compost of two parts of fibrous peat, one part of leaf mould, and a free admixture of silver sand, or, better still, of broken sandstone. If grown in pots for a cool frame or for the greenhouse, where it makes most pleasing objects, the above mixture will be found equally suitable; but in either case avoid putting in too much soil; a depth of 3in. to 4in. is quite sufficient. It is also indispensable that thorough drainage should be secured, for water remaining stagnant about its roots is very injurious to *P. Dryopteris*. In planting, great care must also be taken to prevent the rhizomes from being buried too deeply, in which case they seldom grow; they must be kept only just below the surface of the soil, through which it is advisable to allow the tips to protrude. Planting should take place about April, and a moderate watering must follow, after which the soil requires to be kept constantly moist. Although totally deprived of foliage during four or five months of the year, the Oak Fern should never be allowed to get dry at the roots, for the rhizomes soon shrivel up and the spring growth then only produces small or deformed fronds, as the plants are much weakened. It is also advisable to give plants grown in pots a slight covering during the winter, though they do not require this attention when planted out.

This species, readily increased by division, does not appear to have produced any constant variations; several more or less curious forms of it have from time to time been noticed, but none of them have remained constant under cultivation.

P. (Cyrtomiphlebium) dubium — Cyr-tom-iph-leb′-ĭ-um; dub′-ĭ-um (doubtful), *Hooker*.

This stove species, native of the Andes of Ecuador and Peru, is exceedingly like some of the forms of *Aspidium* (*Cyrtomium*) *falcatum* in habit and texture. Its fronds, borne on strong, tufted stalks 1ft. to 1½ft. long and densely scaly throughout their length, are 2ft. to 3ft. long, 6in. to 12in. broad, with unequal-sided leaflets 3in. to 6in. long, terminating in a sharp point and finely

toothed along the edge. They are of a leathery texture, and the abundant sori (spore masses) are roundish or oblong. — *Hooker*, *Species Filicum*, v., p. 15.

P. (Goniopteris) Eatoni—Go-nĭ-op′-ter-is ; Eat′-on-i (Eaton's), *Baker.*

A greenhouse species, of small dimensions, native of South Mexico. It is provided with a firm, creeping rhizome, as thick as a quill and densely scaly, from which the narrowly-triangular fronds are produced. These are about 1ft. long, 6in. broad, and cut down to a broad wing into spear-shaped, simple leaflets nearly 1in. broad, of a soft, papery texture, and naked on both surfaces. The sori (spore masses) are disposed in one row near the midvein.—*Hooker*, *Synopsis Filicum*, p. 511.

P. (Phymatodes) ebenipes—Phy-mat-o′-dēs ; eb-en′-ip-ēs (black-footed), *Hooker.*

This greenhouse species, native of Northern India, where, according to Beddome, it is found at 8000ft. elevation in Sikkim and the North-Western Himalayas, and at 10,000ft. elevation in Nepaul, resembles *P. trifidum*, but its leaflets reach down deeper, and the main veins are closer and more distinct.—*Hooker*, *Species Filicum*, v., p. 88. *Beddome*, *Ferns of British India*, t. 138.

P. effusum—ef-fu′-sum (spreading). A synonym of *Nephrodium effusum.*

P. elasticum—el-as′-tic-um (elastic), *Richards.*

This stove species, better known in gardens under the names of *P. plumula* and *P. Schkuhri*, is a very distinct, stove species, whose habitat extends from Mexico to Peru and Brazil. Its fronds, borne on black, slender, naked stalks 1in. to 3in. long, are produced from a short-creeping or sub-erect, stout, woody rhizome. They are spear-shaped, 1ft. to 1½ft. long, 2in. to 4in. broad, and cut down to the rachis (stalk of the leafy portion) into numerous strap-shaped, blunt, entire leaflets of a very elastic nature, the lower ones being gradually reduced. The fronds are naked on both surfaces, and the minute, superficial sori (spore masses) are disposed in one row on each side of the midvein.—*Hooker*, *Species Filicum*, iv., p. 200. *Nicholson*, *Dictionary of Gardening*, iii., p. 189.

P. (Campyloneuron) ensifolium—Camp-yl-on-eur′-on ; en-sif-ol′-ĭ-um (sword-fronded), *Willdenow.*

A form of *P. angustifolium*, with very narrow, stalkless fronds, between the edge and the midrib of which the spore masses are disposed in one row.—*Hooker*, *Synopsis Filicum*, p. 348.

P. (Goniophlebium) ensiforme — Go-nĭ-oph-leb′-ĭ-um ; en-sif-or′-mĕ (sword-shaped), *Thunberg.*

A greenhouse species, from Cape Colony and Natal, provided with a stout rhizome clothed with rusty-brown scales. The fronds, 6in. to 12in. long and 4in. to 6in. broad, consist of a strap-shaped terminal leaflet 3in. to 4in. long and of several distant similar ones on each side. These are of a very thick texture, naked on both sides, and the large and conspicuous spore masses are distinctly immersed.—*Hooker*, *Species Filicum*, v., p. 23.

P. (Phegopteris) erubescens—Phe-gop′-ter-is ; e-rub-es′-cens (reddish), *Wallich.*

This is a very strong-growing, Nephrodium-like, greenhouse species, which, Beddome states, is found growing throughout the Himalayas and Sikkim, where it occurs at about 2000ft. elevation. Its fronds, 3ft. to 4ft. long and 1ft. to 2ft. broad, are borne on naked stalks 2ft. or more in length, of a glossy nature ; their lower leaflets, sometimes 1ft. long, are cut down nearly to the midrib into close, bluntish, entire lobes. The texture is rigid and somewhat leathery, and the spore masses are situated close to the raised midrib.—*Hooker*, *Species Filicum*, iv., p. 236. *Beddome*, *Ferns of British India*, t. 213.

P. (Goniophlebium) erythrocarpum — Go-nĭ-oph-leb′-ĭ-um ; er-yth-roc-ar′-pum (red-fruited), *Mettenius.*

A greenhouse species, of small dimensions and of little decorative value, native of Sikkim, where it occurs at elevations varying from 8000ft. to 11,000ft. —*Hooker*, *Synopsis Filicum*, p. 511.

P. (Goniopteris) excelsum—Go-nĭ-op′-ter-is ; ex-cel′-sum (tall), *Baker.*

This stove species, of large dimensions, native of Tanna and Aneiteum, is of very peculiar and distinct habit, being arborescent ; the trunk, according

to Baker, sometimes attains 30ft. in height. Its ample fronds are furnished with strap-shaped leaflets 1ft. to 1¼ft. long, sharp-pointed, and cut down to a broad wing into close, bluntish, somewhat sickle-shaped lobes of a rigid and leathery texture. The sori (spore masses) are disposed on all the veins, which are very minute.—*Hooker*, *Synopsis Filicum*, p. 504.

P. exiguum—ex-ig′-ŭ-um (little), *Grisebach.*

A singular and pretty, stove species, native of Jamaica. Its fronds, borne on tufted, thread-like, very short, naked stalks, are of a conspicuously pendulous habit; they vary between 6in. and 2ft. in length, but are seldom more than ⅛in. in breadth. They are furnished with tiny leaflets, blunt, entire, or with a single notch on the upper side, enlarged on both sides at the base, of a somewhat leathery texture, and naked on both surfaces. The sori (spore masses) are disposed one in each leaflet.—*Hooker*, *Synopsis Filicum*, p. 326.

P. fallax—fal′-lax (deceptive), *Schlechtendahl.*

A greenhouse species, of very small dimensions, seldom exceeding 2½in. high, with fronds often more than 1in. apart on a long, thread-like rhizome. It is of botanical value only, and is a native of Mexico.—*Hooker*, *Species Filicum*, iv., p. 215.

P. farinosum—far-i-no′-sum (mealy), *Hooker.*

This is a scarce and very distinct, stove species, native of the Andes of Ecuador. It differs from all other species through its pendent fronds, 4in. to 5in. long, 1½in. to 2in. broad, borne on short, flexuose stalks of a wiry nature, being covered on both sides with white meal. The leaflets, 1in. or more in length, are blunt at their extremity and slightly undulated at the edge; they are of a somewhat leathery texture and produce spore masses in abundance.—*Hooker*, *Species Filicum*, p. 223; *Second Century of Ferns*, t. 47.

P. (Grammitis) fasciatum—Gram-mi′-tis; fas-cĭ-a′-tum (band-shaped), *Mettenius.*

A stove species, of little decorative value, with leathery fronds 1ft. long, undivided, and the oblong sori (spore masses) disposed in two rows, end to end, close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 169.

P. (Campyloneuron) Fendleri — Camp-yl-on-eur′-on ; Fend′-ler-i (Fendler's), *Eaton.*

This handsome, stove species, also known in gardens as *Campyloneuron magnificum*, is a robust-growing Fern, native of Venezuela and New Granada. It is provided with a stout rhizome densely clothed with large, spear-shaped scales of a peculiar greyish-brown colour. Its ample fronds, borne on strong, naked stalks 1½ft. to 2ft. long and of a glossy nature, are furnished with leaflets 1ft. to 1½ft. long, 2in. to 4in. broad, with edge entire, narrowed at the base, and of a leathery texture ; they are of a pale green colour and glossy on both sides. The spore masses are disposed in three or four rows between the midvein and the edge.—*Hooker*, *Synopsis Filicum*, p. 349.

P. (Dictyopteris) ferrugineum — Dic-tŷ-op′-ter-is ; fer-ru-gin′-ĕ-um (rusty-coloured), *Baker.*

A stove species, of medium dimensions, native of New Guinea, with fronds 1ft. to 1¼ft. long, 8in. broad, borne on stalks 1½ft. long, clothed densely below and less so above with rusty-brown down and large spear-shaped scales of the same colour. The leaflets are divided into leafits, which are again cut into oblong, deeply-notched lobes of a thin, papery texture, and sprinkled on their under-surface with rusty-coloured hairs. The sori (spore masses) are disposed in two rows on each side of the midvein.—*Hooker*, *Synopsis Filicum*, p. 318.

P. Filipes—Fi′-lip-ēs (thread-footed). This is simply *P. tenellum* in a young state.

P. firmum—fir′-mum (firm), *Klotzsch.*

A stove Fern, of small dimensions, native of Guiana and New Granada. According to Hooker, it is scarcely more than a variety of *P. rigescens*, with leaflets more separated.—*Hooker*, *Synopsis Filicum*, p. 335.

P. (Niphobolus) fissum—Niph-ob′-ol-us ; fis′-sum (cleft), *Baker.*

This greenhouse species, native of the Himalayas, where it occurs at elevations varying between 5000ft. and 6000ft., is characterised by its strap-shaped, nearly stalkless fronds, which are 6in. to 12in. long, ½in. to 1½in. broad, of a somewhat leathery texture, naked on their upper side, but very

woolly beneath. The abundant sori (spore masses) are scattered and immersed amongst the downy substance. *P. porosum* is synonymous with this species. —*Hooker*, *Species Filicum*, v., p. 48. *Beddome*, *Ferns of Southern India*, t. 183.

P. flabelliforme—fla-bel-lif-or′-mĕ (fan-shaped), *Lamarck.*

This stove species, native of Columbia and Peru, is readily distinguished through its flaccid habit, the slender, thread-like nature of its rachis, and the paucity of its spore masses. Its drooping fronds, 4in. to 12in. long, scarcely ½in. broad, borne on tufted, short stalks, fringed with long, soft hairs, are cut down throughout nearly or quite to the midrib into entire or slightly-notched leaflets attached at the base. The texture is soft and papery, and the sori (spore masses) are disposed one to three to each leaflet.—*Hooker*, *Species Filicum*, iv., p. 187.

P. (Niphobolus) floccigerum — Niph-ob′-ol-us ; floc-cig′-er-um (wool-bearing), *Mettenius.*

This stove species, native of Northern India, the Philippines, and Malaysia, is also known as *Antrophyum niphoboloides;* it resembles *N. fissum*, but the fronds are narrower and more rigid in texture. Its wide-creeping rhizomes are covered with bright, rust-coloured, spear-shaped scales. The very short-stalked fronds are undivided, 6in. to 12in. long, ¼in. to ½in. broad, gradually narrowed to both ends, and rigid in texture ; their upper surface is naked, while the lower one is densely matted with a somewhat rusty-coloured down, in which the sori, covering the upper part of the frond, are immersed.—*Hooker*, *Synopsis Filicum*, p. 351.

P. (Niphobolus) flocculosum—Niph-ob′-ol-us ; floc-cul-o′-sum (furnished with little tufts of a woolly substance), *Don.*

According to Hooker, this very distinct, greenhouse species, of medium dimensions, is a native of Northern India, where it ascends to 5000ft. elevation. Beddome, in his exhaustive work, "Ferns of British India," states that it is found "chiefly in North Bengal and along the lower ranges of the Himalayas, from very low altitudes of Sylhet and Assam to 3500ft. in Kumaon, from Simla in the west to Bhotan in the east." Its entire (undivided) fronds, produced from a short rhizome clothed with scales of a light brown colour,

and borne on firm, erect stalks 4in. to 6in. long and woolly upwards, are 6in. to 18in. long, 1in. to 1½in. broad, and very gradually narrowed to the apex. They are of a leathery texture, naked on their upper surface, but densely clothed underneath with a woolly substance of a somewhat rusty-brown colour. The small, bright-coloured sori (spore masses) are disposed in straight diagonal rows from midrib to edge and occupy the central portion of the frond. Fig. 42 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 49. *Beddome*, *Ferns of British India*, t. 162.



Fig. 42. Polypodium flocculosum (much reduced).

P. (Phegopteris) formosum—Phe-gop′-ter-is ; for-mo′-sum (beautiful), *Raddi.*

This very handsome, stove species is a native of Brazil. Its fronds, of a rich, dark shining green colour, are produced from an upright caudex (stem) densely covered with scales of a dark reddish-brown colour. They are 1¼ft. to 1½ft. long, and are once divided to the midrib into narrow-spear-shaped leaflets, which are short-stalked and furnished with rounded pinnules (leafits). The stalks of the fronds are about 10in. long and scaly, especially near the base. The sori (spore masses) cover the whole under-side of the fronds.—*Lowe*, *Ferns British and Exotic*, ii., t. 53.

P. (Drynaria) Fortunei—Dryn-a′-rĭ-a ; For-tu′-nĕ-i (Fortune's), *Kunze.*

A singular, greenhouse species, native of South China, where it is said to be found both on the coast and in the interior. The fronds, which are produced from a short-creeping rhizome of a woody nature, are of two thoroughly distinct forms : the barren ones are seldom more than 2in. to 3in. long and 1in. to 1½in. broad ; while the fertile ones are 1ft. to 1½ft. long, 4in. to 6in. broad, and cut down nearly or quite to the rachis into spear-shaped, bluntish lobes of a somewhat leathery texture and 2in. to 4in. long. The sori (spore masses) are disposed in single rows between the main veins. —*Hooker*, *Species Filicum*, v., p. 95.

P. fossum—fos′-sum (ditch-loving), *Moore.*

This distinct and interesting, stove species, native of the Eastern Archipelago, is better known under the name of *Pleopeltis fossa.* Its pretty arching habit of growth and comparatively small size make it a very suitable object for suspending in a basket from the roof of the stove Fernery. The fronds, about 1ft. long and varying from narrow-strap-shaped to egg-shaped, are produced from a short and slowly-creeping rhizome ; their edges are either toothed or lobed, with lobes varying in size according to the breadth of the frond, simple or forked, and in the broadest fronds conspicuously fan-shaped. They are of a deep green colour and of a glossy nature, and the large, roundish spore masses are sunk in deep cavities which form a line of protuberances on the upper surface.—*Nicholson, Dictionary of Gardening*, iv., p. 592.

P. (Goniophlebium) fraxinifolium — Go-nĭ-oph-leb′-ĭ-um ; frax-in-if-ol′-ĭ-um (Ash-leaved), *Jacquin.*

The habitat of this distinct, stove species, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841, extends from Columbia to Brazil and Peru. It is an easily-grown plant provided with a stout rhizome,

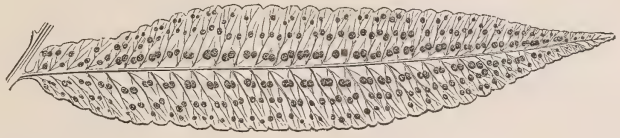


Fig. 43. Leaflet of Polypodium fraxinifolium (⅓ nat. size).

clothed with spreading, dark brown scales. The fronds, 2ft. to 4ft. long and 1ft. to 1½ft. broad, are borne on firm, erect, naked stalks 1ft. to 2ft. long, and are composed of numerous leaflets 4in. to 9in. long, 1in. to 2in. broad, slightly notched at the edges and narrowed at the base. They are of a leathery texture, naked on both sides, and their sori (spore masses) are disposed in three more or less regular rows on each side of the midvein (Fig. 43).—*Hooker, Species Filicum*, v., p. 26. *Nicholson, Dictionary of Gardening*, iii., p. 189.

P. furcatum—fur-ca′-tum (forked), *Mettenius.*

A stove species, of small dimensions and of little decorative value, native of Guiana and the Amazon Valley. Its fronds, 3in. to 4in. long and repeatedly

forked, are of a somewhat leathery texture, and their oblong, distant, oblique spore masses are terminal on the principal veins.—*Hooker*, *Species Filicum*, iv., p. 174.

P. furfuraceum—fur-fur-a′-cĕ-um (scurfy), *Schlechtendahl.*

A greenhouse species, of rigid habit and medium dimensions, native of Mexico, with fronds 1ft. to 1½ft. long, 2in. to 4in. broad, of a leathery texture, and borne on rigid, scaly stalks 3in. to 4in. long. These fronds are produced from strong rhizomes densely clothed with brown, woolly fibres, and are cut down to the rachis (stalk of the leafy portion) into narrow, entire leaflets dilated on both sides at the base. The sori (spore masses) are disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 213.

P. fuscatum—fus-ca′-tum (darkened), *Blume.*

This stove species, of small dimensions, is of very little decorative value. Its fronds, seldom exceeding 6in. long, are of a leathery texture ; the whole of their under-surface is eventually filled with the sori (spore masses), which are disposed in a close row on each side of the midrib. It is a native of Java and Ceylon.—*Hooker*, *Species Filicum*, iv., p. 181. *Beddome*, *Ferns of British India*, t. 324.

P. (Phymatodes) fusco-punctatum — Phy-mat-o′-dēs ; fus′-co-punc-ta′-tum (brown-dotted), *Hooker.*

A greenhouse species, of small dimensions, native of Chimborazo. From a wide-creeping rhizome of a woody nature, and clothed with bright brown scales, are produced its almost stalkless fronds 6in. to 9in. long, very gradually narrowed at the base, sharp-pointed at the extremity, and with edges entire ; they are of a somewhat leathery texture and naked on both sides, but show abundant fine dark brown points. The large, dark-coloured spore masses are disposed in one line along the midvein.—*Hooker*, *Species Filicum*, v., p. 69, t. 285A.

P. Galeottei—Gal-ĕ-ot′-tĕ-i (Galeotti's), *Mettenius.*

This is a small-growing, greenhouse species, native of Mexico. It is of botanical interest only, with small, elliptic fronds of a soft, papery texture and slightly hairy on both surfaces.—*Hooker*, *Synopsis Filicum*, p. 509.

P. (Niphobolus) Gardneri — Niph-ob′-ol-us ; Gard′-ner-i (Gardner's), *Mettenius.*

A stove species, of medium dimensions, native of Ceylon. It is provided with a short-creeping rhizome clothed with rigid, spear-shaped, black scales, with a brown border. The entire (undivided) fronds produced from these rhizomes are 1ft. to 1½ft. long, 1in. to 1½in. broad, very gradually narrowed towards both ends, and borne on firm, naked stalks 3in. to 4in. long ; they are of a leathery texture, and, while their upper surface is naked, the lower one is densely matted with a woolly substance of a grey colour. The sori (spore masses) are disposed in close rows of about four between the main veins.—*Hooker*, *Species Filicum*, v., p. 51 ; *Filices Exoticæ*, t. 68. *Beddome*, *Ferns of Southern India*, t. 241. *Nicholson*, *Dictionary of Gardening*, iii., p. 189.

P. (Phymatodes) geminatum—Phy-mat-o′-dēs ; gem-in-a′-tum (in pairs), *Schrader.*

This greenhouse species, of small dimensions, native of Brazil, is of very distinct appearance on account of its almost stalkless, uniform, entire fronds, 3in. to 6in. long, ½in. to 1in. broad, and narrowed towards both ends, being usually disposed in distant pairs ; they are of a leathery texture and naked on both sides, and are produced from a stout, very wide-creeping rhizome of a scaly nature. The spore masses are disposed in a row midway between the midrib and the edge, and are distinctly immersed.—*Hooker*, *Species Filicum*, v., p. 36. *Nicholson*, *Dictionary of Gardening*, iii., p. 189.

P. (Goniopteris) Ghiesbreghtii — Go-nĭ-op′-ter-is ; Ghies-bregh′-tĭ-i (Ghiesbreght's), *Linden.*

This is a very distinct, stove species, native of South Mexico. Its fronds, borne on firm, erect stalks 1ft. or more in length and densely hairy, are usually 1ft. to 1½ft. long and consist of a terminal pinna (leaflet) 6in. to 9in. long, 1½in. to 2in. broad, and slightly lobed at the edge, and of three to six similar ones on each side. They are of a soft, papery texture ; their upper surface is slightly and their under-side densely hairy. The spore masses are disposed in dense rows close to the midvein.—*Hooker*, *Filices Exoticæ*, t. 84. *Nicholson*, *Dictionary of Gardening*, iii., p. 189.

P. (Phymatodes) glabrum — Phy-mat-o′-dēs ; glab′-rum (smooth), *Mettenius.*

This is a greenhouse species, very closely resembling the better-known *P. angustatum*, from which it differs principally in being of smaller size and in having its spore masses more confluent. It is a native of East Australia, Norfolk Island, Lord Howe's Island, &c.—*Hooker*, *Species Filicum*, v., p. 46.

P. (Phegopteris) glanduliferum — Phe-gop′-ter-is ; glan-dul-if′-er-um (furnished with small glands), *Liebmann.*

This species, of small dimensions, owes its specific name to the nature of its rachis (stalk of the leafy portion), which is finely glandular on both sides. It is a native of Mexico. Its broadly spear-shaped fronds, 6in. to 8in. long and 3in. to 4in. broad, are borne on slender, tufted stalks 3in. to 4in. long. The lower leaflets, which are also the largest, are cut down to the rachis below into distinct, unequal-sided, deeply-cleft leafits, with entire or slightly-toothed lobes, all of a soft, papery texture. The spore masses are situated one at the base of each lobe.—*Hooker*, *Species Filicum*, iv., p. 252.

P. glandulosum—glan-dul-o′-sum (glandular), *Hooker.*

A small-growing, stove species, native of Ceylon, with fronds 2in. to 4in. long, cut down nearly or quite to the rachis into close, deeply-toothed, oblong leaflets of a soft, papery texture, dull green, and densely glandular on both sides. The spore masses are disposed one to three to each leaflet.—*Hooker*, *Species Filicum*, iv., p. 193, t. 276A.

P. (Goniophlebium) glaucophyllum—Go-nĭ-oph-leb′-ĭ-um ; glau-coph-yl′-lum (glaucous-fronded), *Kunze.*

The habitat of this pretty and very distinct, stove species (see Coloured Plate) extends from the West Indies and Columbia to Ecuador. It is a Fern particularly adapted for growing on a piece of rock or of sandstone, upon which its slender, firm, wide-creeping rhizomes readily attach themselves. Its oblong, spear-shaped, entire fronds, rounded at the base and terminating in a sharp point, are of a leathery texture, bright green above, and bluish on their under-side, where the spore masses, which are uniformly disposed and of a bright golden-yellow colour, make a very pretty effect.—*Hooker*, *Species Filicum*, iv., p. 18. *Nicholson*, *Dictionary of Gardening*, iii., p. 189.

P. (Phymatodes) glaucum—Phy-mat-o′-dēs ; glau′-cum (bluish-green), *Kunze.*

This stove species, which in texture and general habit resembles some forms of *P. aureum*, is a native of the Philippines. Its bluish fronds, 1ft. to 1½ft. long and 6in. to 8in. broad, borne on firm, erect stalks 6in. to 12in. long and of a glossy nature, are produced from a stout rhizome clothed with long, narrow scales of a dark brown colour. They are cut down throughout to a broadly-winged rachis into entire, sharp-pointed lobes 4in. to 5in. long, of a leathery texture, and naked on both sides. The sori (spore masses) are disposed in single rows close to the midrib. *P. glaucum* of gardens is identical with *P. aureum sporadocarpum.—Hooker, Species Filicum*, v., p. 88.

P. (Goniophlebium) gonatodes — Go-nĭ-oph-leb′-ĭ-um ; gon-at-o′-dēs (angled). This is synonymous with *P. plesiosorum.*

P. gracile—grac′-il-ĕ (slender), *Hooker.*

A pretty, stove species, native of the Andes of Peru, with flaccid, pendent fronds 6in. to 9in. long, barely 1in. broad, borne on slender, tufted stalks 3in. to 4in. long and of a wiry nature. The leaflets, though scarcely ½in. long, are distinct and deeply cleft into blunt lobes bearing one spore mass each.—*Hooker, Species Filicum*, iv., p. 224. *Hooker and Greville, Icones Filicum*, t. 222.

P. (Grammitis) gramineum—Gram-mi′-tis ; gra-min′-ĕ-um (grass-like), *Swartz.*

This stove species, of purely botanical interest, is very distinct through its leathery fronds, 2in. to 4in. long, being only ⅛in. broad, and also on account of the oval or oblong spore masses being placed nearly end to end, with a space between them, in two rows which reach from the midrib nearly to the edge. It is a native of the West Indies and Guiana.—*Hooker, Species Filicum*, iv., p. 165.

P. grammitidis—gram-mi′-tid-is (Grammitis-like), *R. Brown.*

A greenhouse species, of small dimensions, native of New Zealand and Tasmania, with fronds 4in. to 12in. long, 2in. broad, borne on tufted, naked stalks 1in. to 2in. long and of a wiry nature. The narrow, blunt leaflets are

more or less deeply cleft, of a leathery texture, and naked on both surfaces. The copious oblong spore masses are usually disposed one to each lobe at the base.—*Hooker*, *Species Filicum*, iv., p. 230.

P. (Goniophlebium) grandiceps — Go-nĭ-oph-leb′-ĭ-um ; gran′-dic-eps (large-headed), *Baker*.

A stove species, of dwarf habit and well suited for basket culture, native of Formosa. Its simple (undivided), oblong-spear-shaped fronds, of a leathery texture, are produced at intervals on a slender, creeping rhizome ; they are about 6in. long and 1in. broad, and taper below into a narrow wing.—*Nicholson*, *Dictionary of Gardening*, iv., p. 592.

P. (Goniophlebium) grandidens — Go-nĭ-oph-leb′-ĭ-um ; gran′-did-ens (large-toothed). This is a variety of *P. persicæfolium*.

P. (Phymatodes) grandifolium — Phy-mat-o′-dēs ; gran-dif-ol′-ĭ-um (large-fronded). A variety of *P. membranaceum*.



Fig. 44. Polypodium Griffithianum (½ nat. size).

P. (Phymatodes) Griffithianum—Phy-mat-o′-dēs ; Grif-fith-ĭ-a′-num (Griffith's), *Hooker*.

This distinct, greenhouse species, of medium dimensions, is a native of Northern India. According to Beddome, it is found in Bhotan, Mishmee, and Khasya, and is said to occur up to 7000ft. elevation. Its simple (undivided) fronds, 6in. to 8in. long and 1½in. to 2in. broad, are produced from a wide-creeping rhizome densely clothed with rough, dull brown scales, and borne on firm, erect stalks 3in. to 6in. long. They have their edges prettily undulated, and are sharp-pointed at their summit, while they are rounded or rather narrowed or auricled at their base. The large and conspicuous sori (spore masses) are disposed in a row near the midrib, and situated one between each main vein. Fig. 44 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author. —*Hooker*, *Species Filicum*, v., p. 62 ; *Second Century of Ferns*, t. 51. *Beddome*, *Ferns of British India*, t. 158.



OSMUNDA PALUSTRIS.

P. (Goniophlebium) guatemalense—Go-nĭ-oph-leb′-ĭ-um ; gua-tem-a-len′-sĕ (native of Guatemala), *Hooker*.

This stove species, which, as its name implies, is a native of Guatemala, is the *Phlebodium inæquale* of Moore. It is a robust-growing Fern, with fronds 2ft. to 3ft. long, 1ft. or more in breadth, borne on naked, straw-coloured stalks 6in. to 12in. long. They are composed of an entire terminal leaflet, 6in. to 8in. long and a little more than 1in. broad, and of several similar ones on each side of the midrib. Their texture is somewhat leathery, they are naked on both sides, and their large spore masses are disposed in a single row.—*Hooker*, *Species Filicum*, v., p. 29. *Nicholson*, *Dictionary of Gardening*, iii., p. 189.

P. Guilleminianum—Guil-le-min-ĭ-a′-num (Guillemin's), *Fournier*.

A greenhouse species, of medium size, native of San Rafael, Mexico. Its fronds are 1½ft. long, 8in. to 10in. broad, and borne on slender stalks 6in. long and clothed with minute hairs. They are oblong-spear-shaped and simply pinnate, being only once divided to the midrib into strap-shaped, sharp-pointed leaflets of a pale green colour on both surfaces, and with the spore masses disposed in one close row near the midrib.—*Hooker*, *Synopsis Filicum*, p. 510.

P. (Goniophlebium) harpeodes — Go-nĭ-oph-leb′-ĭ-um ; har-pĕ-o′-des (scimitar-like). This is synonymous with *P. loriceum latipes*.

P. Hartwegianum—Hart-weg-ĭ-a′-num (Hartweg's), *Hooker*.

This greenhouse species, native of Mexico, produces from a stout, wide-creeping rhizome clothed with dark brown scales, fronds 1ft. long, 3½in. broad, cut down to the rachis (stalk of the leafy portion) into narrow-spear-shaped, toothed leaflets dilated at the base and of a papery texture. The plant is readily recognised by its bright yellow, oval sori (spore masses) disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 207 ; *Icones Plantarum*, t. 380.

P. (Phegopteris) Hasseltii—Phe-gop′-ter-is ; Has-selt′-ĭ-i (Hasselt's), *Blume*.

A stove species, of small dimensions and of little decorative value, native of Java.—*Hooker*, *Species Filicum*, iv., p. 257.

P. (Phegopteris) hastæfolium—Phe-gop′-ter-is ; has-tæ-fol′-ĭ-um (spear-fronded), *Swartz.*

This strikingly distinct, small-growing, stove species, native of the West Indies, is a very uncommon plant, although, according to Lowe, it was introduced into English gardens in 1820. Its fronds, borne on tufted stalks 1in. to 2in. long and of a wiry nature, are 6in. to 9in. long, and broadest two-thirds of the way up, where they sometimes measure 2in. across. The blunt, entire leaflets show a sharp and distinct auricle (ear) on both sides at the base, and those of the lower half of the frond are gradually reduced ; they are of a dull green colour and of a somewhat leathery texture, and their under-side is nearly naked. The comparatively large sori (spore masses) are disposed in one row on each side of the midvein, and from ten to fourteen pairs to each leaflet. — *Hooker*, *Species Filicum*, iv., p. 232. *Nicholson*, *Dictionary of Gardening*, iii., p. 189. *Lowe*, *Ferns British and Exotic*, ii., t. 55.

P. (Phymatodes) hastatum — Phy-mat-o′-dēs ; has-ta′-tum (halbert-shaped), *Thunberg.*

A curious and distinct, greenhouse species, of little decorative value, having fronds sometimes simple, sometimes three-lobed, with the lateral lobes like the terminal one but smaller, of a leathery texture, and naked on both sides. The spore masses, disposed in a single row, are situated nearer the midrib than the edge.—*Hooker*, *Species Filicum*, v., p. 74.

P. (Phymatodes) hemionitideum—Phy-mat-o′-dēs ; he-mĭ-on-i-tid′-ĕ-um (Hemionitis-like), *Wallich.*

According to Lowe, this curious and interesting, stove species was introduced into the Royal Gardens, Kew, in 1844, yet it is not commonly met with. It is a native of South China and various parts of India, where it is said to occur up to 6000ft. elevation. Beddome states that it is found in Sampajee Ghât, four miles down from Mercara, in ravines, growing on rocks. Its entire fronds, of a somewhat leathery texture, borne on firm, erect stalks 1in. to 6in. long, are produced from a rhizome of a woody nature. They are from 9in. to 18in. long, 2in. to 3in. broad, of a bright green colour, and narrowed to both ends ; they are naked on both sides and are rendered

very interesting by their distinct venation and by the prominent character and large size of their sori (spore masses), which are disposed in a very irregular row between the main veins, and often confluent.—*Hooker*, *Species Filicum*, v., p. 73. *Nicholson*, *Dictionary of Gardening*, iii., p. 189. *Beddome*, *Ferns of Southern India*, t. 182. *Lowe*, *Ferns British and Exotic*, ii., t. 7.

P. Henchmanni—Hench-man′-ni (Henchmann's), *J. Smith.*

A very graceful, stove species, native of Mexico, and, according to Lowe, introduced into England about 1848. It is provided with a wide-creeping rhizome covered with bright rusty-coloured scales, from which its fronds, borne on firm, erect stalks 4in. to 8in. long, are produced. They are simply pinnate (only once divided to the midrib), 1ft. to 1½ft. long, 6in. to 9in. broad, with leaflets of a somewhat leathery texture, dark bluish-green in colour, and naked on both sides. The large and conspicuous, brilliant brown sori (spore masses) are disposed in one row on each side of the midvein and slightly immersed.—*Hooker*, *Synopsis Filicum*, p. 337. *Lowe*, *Ferns British and Exotic*, i., t. 30.

P. Hendersoni—Hen-der-so′-ni (Henderson's), *Lowe.*

This Fern, of unknown origin, is very similar to *P. angustifolium*, but its fronds are more erect, narrower, and of a paler colour. The barren and fertile ones are of the same size and form, thus differing from the above-named species in a marked manner.—*Lowe*, *Ferns British and Exotic*, ii., t. 37B.

P. (Drynaria) Heracleum — Dryn-a′-rĭ-a ; He-rac-le′-um (Cow-Parsnip-like), *Kunze.*

This really magnificent, large-growing, stove species, native of Java and of the Philippines, is the *P. coronans* of gardens, but not of Wallich ; it is also frequently found under the name of *P. morbillosum.* Whatever its appellation be, it is so thoroughly different from all other species that it should find a place in every collection. Its sessile (stalkless) fronds, 3ft. to 6ft. long and 2ft. or more in breadth, are usually disposed in a crown (Fig. 45), and are produced from a stout, short-creeping rhizome of a woody nature, clothed with long, silky scales of a bright brown colour, except near the extreme end, where they are whitish. These fronds, which are deeply

pinnatifid, have at their base a heart-shaped, lobed wing 3in. to 4in. broad, while their upper part is cut down to a broadly-winged rachis into entire, sharp-pointed lobes, which are often 1ft. to 1½ft. long and 3in. to 4in. broad. The fronds are of a light green colour and of a stiff, harsh texture; their upper surface is covered with minute, short, whitish hairs, while the midrib of



Fig. 45. Polypodium Heracleum
(much reduced).

the frond is crowded with brown hairs, especially near the base, where they are longer. The small and copious sori (spore masses) are irregularly scattered over the whole of the under-surface, in which they are slightly immersed.—*Hooker*, *Species Filicum*, v., p. 93; *Garden Ferns*, t. 1. *Nicholson*, *Dictionary of Gardening*, iii., p. 189. *Lowe*, *Ferns British and Exotic*, ii., t. 32.

P. (Niphobolus) Heteractis—Niph-ob′-ol-us; He-ter-ac′-tis (Heteractis). A variety of *P. Lingua*.

P. (Phymatodes) heterocarpum — Phy-mat-o′-dēs; het-er-oc-ar′-pum (having variable fruit), *Blume*.

A stove species, of little decorative value, greatly resembling the better-known *P. membranaceum*, from which it differs principally in its smaller dimensions and also in its spore masses being disposed in four to six regular rows near the main veins. It is a native of Northern India, Ceylon, Java, Borneo, &c., and is also called *P. Zollingerianum*.—*Hooker*, *Species Filicum*, v., p. 72. *Beddome*, *Ferns of British India*, t. 319.

P. heteromorphum—het-er-om-or′-phum (of various forms), *Hooker and Greville.*

This greenhouse species, of large dimensions and distinct habit, found in Mexico and along the Andes to Ecuador, is also known as *P. variabile.* Its very flaccid, pendent, sometimes simple, sometimes repeatedly forked or pinnate fronds, are borne on tufted, slender, naked stalks of a wiry nature. When repeatedly forked, they are furnished with closely-set, irregular leafits 1ft. to 1½ft. long, but only about ¼in. broad, of a soft, papery texture, and bearing from one to six spore masses each.—*Hooker*, *Species Filicum*, iv., p. 229. *Hooker and Greville*, *Icones Filicum*, t. 108.

P. (Dictyopteris) heterosorum — Dic-tŷ-op′-ter-is ; het-er-os-or′-um (having variable sori), *Baker.*

A strong-growing, stove species, of little decorative value, with fronds 2ft. to 3ft. long, but only pinnatifid, and abundant irregular sori (spore masses), which often become confluent. It is a native of Malacca.—*Hooker*, *Synopsis Filicum*, p. 506.

P. (Phegopteris) hexagonopterum—Phe-gop′-ter-is ; hex-ag-o-nop′-ter-um (having six-angled wings), *Michaux.*

This very pretty and distinct, hardy species, of a deciduous character, is principally a North American Fern, being found in moist woodlands from Canada to Florida, and westward to Iowa, Arkansas, and Louisiana, and, though not common, fairly abundant in favourable localities, more particularly in the Middle and Southern States. Although Eaton, in his exhaustive work, "Ferns of North America," states (vol. i., p. 148) that it has not been found outside of North America, we find it stated in Hooker's "Synopsis Filicum" (p. 308) that it is found "from Lapland to Japan, Etruria and Greece; Greenland, Iceland, and Russian America, southward to the United States." According to Lowe, its introduction into England dates from about the year 1811. Its slender and wide-creeping rhizome (rootstock), sometimes 1ft. long, is of a somewhat fleshy nature, and creeps just beneath the surface of the ground. The fronds, which are borne on slender stalks 6in. to 9in. long, naked, except towards the base, are 6in. to 9in. long, 4in. to 6in. broad, and subdeltoid (somewhat like the Greek delta, Δ). Their lower leaflets, 2in. to

3in. long, ½in. or more in breadth, are cut down three-quarters of the way to the rachis into close, blunt, entire or slightly-toothed lobes, the lowest pair of which are deflexed. The fronds are of a light green colour, soft and papery in texture, and slightly hairy on their under-side, and their abundant round spore masses are placed nearer the edge than the midveins. This Fern prefers a soft, spongy soil, and a situation naturally cool.—*Hooker*, *Species Filicum*, iv., p. 245 ; *British Ferns*, t. 3. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Lowe*, *Ferns British and Exotic*, i., t. 49. *Eaton*, *Ferns of North America*, ii., t. 65. *Correvon*, *Les Fougères rustiques*, p. 150.

P. (Phegopteris) Hildebrandi — Phe-gop′-ter-is ; Hil-deb-ran′-di (Hildebrand's), *Hooker*.

A gigantic, stove species, native of the Sandwich Islands, with fronds 3ft. to 4ft. or more in length, 2ft. to 3ft. broad, and borne on stout stalks 2ft. or more in length, clothed with long, narrow scales. The lowest leaflets, 1ft. to 1½ft. long, have their pinnules (leafits) largest on the lower side, sometimes again divided into deeply-cleft segments, the whole being of a soft, papery texture and dark green colour. The under-surface is sprinkled over with transparent glands, and the large and abundant spore masses are disposed near the margins of the segments.—*Hooker*, *Species Filicum*, iv., p. 254.

P. (Goniopteris) Hillii—Go-nĭ-op′-ter-is ; Hil′-lĭ-i (Hill's), *Baker*.

This greenhouse species, native of Queensland, is of distinct appearance through its simply-pinnate (once-divided) fronds being almost in the shape of the Greek delta, Δ, and measuring 1ft. each way. The opposite, stalkless, strap-shaped leaflets are 5in. to 6in. long, 2in. broad, deeply notched, and narrowly wedge-shaped at the base ; they are of a thick but not stiff texture, dull green in colour, and densely covered with short, soft hairs. Their spore masses are situated close to the main veins.—*Hooker*, *Synopsis Filicum*, p. 505.

P. (Phymatodes) himalayense — Phy-mat-o′-dēs ; hi-ma-lay-en′-sĕ (Himalayan), *Hooker*.

A greenhouse species, also known in gardens under the name of *P. venustum ;* it is a native of Northern India, Nepaul, Khasya, Bhotan, and Sikkim, where, according to Beddome, it occurs up to 7500ft. elevation. It is provided with a wide-creeping rhizome of a woody nature, covered with rough

scales of a bright brown colour, from which its large, simply-pinnate fronds are produced. These are borne on firm stalks 1ft. or more in length, and of a glossy nature ; they are 1ft. to 2ft. long and 8in. to 12in. broad, with leaflets 1in. to 2in. apart. The leaflets are sharp-pointed at their extremity, rounded or even heart-shaped at their base, and have the edge wavy. The fronds are of a somewhat leathery texture, their under-surface is finely hairy, and their spore masses are disposed in one or two rows of three or four each between the main veins.—*Hooker*, *Species Filicum*, v., p. 91. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Beddome*, *Ferns of British India*, t. 318.

P. hirsutulum—hir-su′-tul-um (slightly hairy), *Fée.*

A small-growing, stove species, of little decorative value, with short, pendulous fronds of a somewhat leathery texture, and covered, as well as their stalks, with minute, brown hairs. It is a native of Rio Janeiro.—*Hooker*, *Synopsis Filicum*, p. 509.

P. (Phegopteris) hirsutum — Phe-gop′-ter-is ; hir-su′-tum (hairy), *Swartz.*

This stove species, of small dimensions, native of Minas Geraes, Brazil, has oblong-spear-shaped fronds, 6in. to 9in. long and tripinnatifid (three times divided half-way to the midrib). They are borne on tufted stalks, 3in. to 4in. long, clothed with dense, spreading, narrow scales, are of a parchment-like texture, and are covered on both surfaces, but especially on the lower one, with narrow scales. The sori (spore masses) are disposed in a row on each side of, and close to, the midvein.—*Hooker*, *Synopsis Filicum*, p. 505.

P. hirtellum—hir-tel′-lum (shaggy), *Blume.*

A small-growing, stove species, of tufted habit, of botanical interest only. Its small, entire fronds, of a somewhat leathery texture, have both surfaces clothed with long, soft, brown hairs. The spore masses are disposed in two close rows nearer the midrib than the edge. It is a native of India.—*Hooker*, *Species Filicum*, v., p. 166. *Beddome*, *Ferns of British India*, t. 172.

P. Hookeri—Hook′-er-i (Hooker's), *Brackenridge.*

This is a very distinct, small-growing, stove species, native of the Sandwich Islands, Fiji, Queensland, and the Philippines. Its simple (undivided)

fronds, 3in. to 5in. long, have the point bluntish, the edge entire, and the lower part gradually narrowed; they are of a somewhat leathery texture, and thinly clothed with soft hairs on both sides. The abundant round sori (spore masses) are disposed in long rows close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 171.

P. (Dipteris) Horsfieldii — Dip′-ter-is; Hors-field′-ĭ-i (Horsfield's). Synonymous with *P. Dipteris.*

P. hymenophylloides — hym-en-oph-yl-lŏ-i′-des (Hymenophyllum-like), *Kaulfuss.*

This small-growing, stove species, native of the Sandwich Islands, is a very distinct Fern, resembling a Hymenophyllum in habit as well as in texture. It is provided with very slender rhizomes of a fibrous nature, and its little fronds, 2in. to 4in. long and ¼in. to ⅜in. broad, are borne on densely-tufted and very slender stalks 1in. or less in length. The closely-set leaflets, usually dimidiate (fully developed on one side of the midrib and scarcely at all on the other), are cut down to a broadly-winged rachis into a few small, oblong lobes of a soft texture and pellucid or transparent nature; they are finely glandular on both sides, and the spore masses are disposed at their extremity.—*Hooker*, *Species Filicum*, iv., p. 228. *Hooker and Greville*, *Icones Filicum*, t. 176.

P. inæquale—in-æ-qua′-lĕ (unequal), *Fée.*

A stove species, native of Guadeloupe and Jamaica, with fronds 1½ft. long, 3in. to 4in. broad, and cut down within ½in. of the rachis throughout into narrow-oblong, bluntish lobes, those of the lower part being much reduced. The texture of the fronds is somewhat leathery, they are naked on both sides, and their spore masses are situated nearer the edge than the midrib. This species is quite distinct from *P. inæquale* of Moore, which is a synonym of *P. guatemalense.*—*Hooker*, *Synopsis Filicum*, p. 325.

P. (Goniophlebium) incanum—Go-nĭ-oph-leb′-ĭ-um; in-ca′-num (hoary), *Swartz.*

This curious and very distinct, stove species, of dwarf habit, has an extensive range of habitat. Hooker gives it as a native of Cape Colony,

Natal, Zambesi Land, and from Ohio to Uruguay and Chili; whereas Eaton states that it grows commonly in large tufts on trunks of trees, on old walls and roofs, and more rarely on rocks, from Florida to Texas, extending northward to the Natural Bridge, Virginia. Eaton adds that it is common in the West Indies, and Lowe, who gives 1841 as the date of its introduction into the Royal Gardens, Kew, says that it is a native of the West Indies and South America. Its wide-creeping rhizomes, of a woody nature, are very much entangled and clothed with small, dull brown scales. The fronds, 2in. to 4in. long, 1½in. broad, and borne on firm, erect stalks 1in. to 4in. long, are cut down to the rachis into entire, blunt leaflets, which are enlarged at the base, of a leathery texture, and densely scaly on their under-side. The sori (spore masses) are disposed in a row on each side of the midvein, and are almost completely hidden by the scales covering the under-side of the leaflets.—*Hooker*, *Species Filicum*, iv., p. 209. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Eaton*, *Ferns of North America*, i., t. 26. *Lowe*, *Ferns British and Exotic*, i., t. 48A.

P. (Phymatodes) incurvatum—Phy-mat-o′-dēs; in-cur-va′-tum (incurved, bent in), *Blume*.

A very distinct, stove species, native of Mount Ophir, Malacca, and Java, with barren and fertile fronds totally distinct, produced from a scaly rhizome of a woody nature. The barren ones are 6in. to 9in. each way, deltoid (in shape of the Greek delta, Δ), and cut into broad, spear-shaped, entire lobes; the larger fertile ones are cut down nearly or quite to the rachis (stalk of the leafy portion) into entire, distant lobes 4in. to 8in. long, the lowest of these being often forked. The fronds are of a very leathery texture and naked on both sides. The deeply-immersed sori (spore masses) form prominent projections on the upper surface.—*Hooker*, *Species Filicum*, v., p. 77. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Beddome*, *Ferns of British India* t. 124.

P. (Phymatodes) insigne—Phy-mat-o′-dēs; in-sig′-nĕ (remarkable), *Blume*.

This stove species, of small dimensions, native of Java, the Philippines, and Malacca, is provided with a slender rhizome from which the fronds, 6in. to 9in. long, are produced. These fronds are formed of a terminal, entire,

spear-shaped, and sharp-pointed lobe 2in. to 3in. long, ½in. or more in breadth, and of two to four similar ones on each side; they are of a firm texture and naked on both sides. The small and abundant spore masses are irregularly scattered.—*Hooker*, *Species Filicum*, v., p. 78. *Beddome*, *Ferns of British India*, t. 214.

P. integrifolium—in-teg-rif-ol′-ĭ-um (entire-leaved), *Lowe.*

A stove species, of unknown origin, closely related to *P. irioides*, from which, however, it is readily distinguished by the hanging habit of its fronds, which are sometimes forked at their extremity; they are also of a less fleshy nature and of a darker green colour than those of that species; they are frequently 1½ft. long and 2in. broad in their widest part. The abundant and very small spore masses are thickly scattered over the upper half of the frond.—*Lowe*, *Ferns British and Exotic*, ii., t. 27.

P. (Phymatodes) irioides — Phy-mat-o′-dēs; i-rĭ-ŏ-i′-des (Iris-like), *Lamarck.*

This singular-looking, erect-growing, stove species, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1824, is a native of New South Wales, Natal, Angola, the Guinea Coast, &c. Its stalkless fronds, produced from a stout rhizome clothed with dark brown, egg-shaped scales, are from 1ft. to 3ft. long, 1in. to 3in. broad, gradually narrowed to both ends, and with edge entire; they are of a thick, fleshy texture, pale or yellowish-green in colour, and naked on both sides. The very small and copious sori (spore masses) are irregularly scattered.—*Hooker*, *Species Filicum*, v., p. 67; *Filices Exoticæ*, t. 4. *Lowe*, *Ferns British and Exotic*, i., t. 42A. *Beddome*, *Ferns of Southern India*, t. 178.

P. (Dictyopteris) irregulare—Dic-tў-op′-ter-is; ir-reg-ul-a′-rĕ (irregular). Synonymous with *P. difforme.*

P. Jagorianum—Jag-or-ĭ-a′-num (Jagor's), *Mettenius.*

A stove species, of small dimensions and of little decorative value, but interesting through the oblong spore masses having their sporangia armed with a conspicuous bristle. It is a native of the Philippines.—*Hooker*, *Synopsis Filicum*, p. 507.

P. (Phymatodes) juglandifolium—Phy-mat-o′-dēs ; ju-glan-dif-ol′-ĭ-um (Walnut-leaved), *Don.*

This greenhouse species, which is found in Northern India up to 10,000ft. elevation, is very variable as regards the size of its fronds, which are simply pinnate (only once divided to the midrib) and usually 1½ft. to 2ft. long, 1ft. or more in breadth, and borne on firm, erect stalks 1ft. or more in length and of a glossy nature. These fronds are produced from a stout, woody rhizome covered with large, egg-shaped scales of a bright rusty-brown colour, and composed of a terminal leaflet and of several pairs of lateral ones disposed 1in. or 2in. apart, the edge of which is thickened and wavy, and the base usually rounded. They are of a somewhat leathery texture, naked on both sides, and the large and abundant spore masses form a row nearer the midrib than the edge. *P. capitellatum* is identical with this species.—*Hooker*, *Species Filicum*, v., p. 90. *Nicholson*, *Dictionary of Gardening*, iii., p. 190.

P. Karwinskianum—Kar-win-skĭ-a′-num (Karwinski's), *A. Braun.*

A stove species, of botanical interest only, with rhizome, fronds, and fructification similar to those of our popular *P. vulgare*. It is a native of Mexico and Guatemala.—*Lowe*, *Ferns British and Exotic*, ii., t. 40.

P. khasyanum—khas-ў-a′-num (native of Khasya), *Hooker.*

This is a very distinct, small-growing, stove species, native of Khasya and Assam, where, according to Hooker and Beddome, it occurs at elevations varying between 3000ft. and 4000ft. Its narrow fronds, 1ft. long, but seldom more than 1½in. broad, and borne on very short, tufted stalks fringed with short hairs, are of a flaccid nature and cut down within a short distance of the rachis into linear-oblong, either entire or slightly undulated, blunt lobes of a thick and somewhat leathery texture and hairy on both sides. The spore masses are sunk and disposed in rows of from four to six on each side of the midrib.—*Hooker*, *Species Filicum*, iv., p. 191 ; *Second Century of Ferns*, t. 49. *Beddome*, *Ferns of British India*, t. 173.

P. (Goniophlebium) Korthalsii — Go-nĭ-oph-leb′-ĭ-um ; Kor-thals′-ĭ-i (Korthals'), *Mettenius.*

This stove species, native of Sumatra, somewhat resembles the better-known *P. subauriculatum*. It is provided with a wide-creeping rhizome, from

which its fronds, 1ft. to 1¼ft. long and 1ft. broad, are produced; these are borne on smooth stalks 5in. to 6in. long and of a reddish-brown colour. The loose, spreading leaflets are stalkless, 5in. to 7in. long, 1in. to 1½in. broad, wedge-shaped at the base, and slightly notched along the edges; they are of a somewhat leathery texture, naked on both sides, and, unlike *P. subauriculatum*, have their spore masses disposed in two or three rows on each side of the midvein.—*Hooker*, *Synopsis Filicum*, p. 345.

P. Krameri—Kra′-mer-i (Kramer's), *Franchet and Savatier.*

This very pretty, hardy species, introduced from Japan in 1878, though quite distinct, resembles our common Beech Fern (*P. Phegopteris*) in being of a deciduous nature, and in having extensively-creeping and freely-branching rhizomes. Its fronds, borne on slender, wiry stalks 3in. to 4in. long, are of a particularly pale green colour, 5in. to 6in. long, and 2½in. to 3in. broad; they are not cut to the midrib, but all the segments are connected with it by a broad wing, being cut half-way down into oblong, undulated lobes, while the lower pair, which are more deeply cut, are conspicuously deflexed. The fronds are of a thin, papery texture, and the numerous black spore masses are scattered over the whole of their under-surface, from the wing to the apex of the segments, in which they form two lines on each side of the midvein. —*T. Moore*, *Gardeners' Chronicle*, 1881, p. 136.

P. (Phymatodes) Labrusca — Phy-mat-o′-dēs; Lab-rus′-ca (resembling *Vitis Labrusca*), *Hooker.*

This very distinct, stove species, native of Borneo, produces from a woody rootstock its very distinct, curiously-shaped fronds, 3in. to 4in. long, 2½in. to 3in. broad, with a deep notch at the base and wavy edges; they are of a leathery texture, naked on both sides, and resemble the leaves of *Vitis Labrusca*, the American Grape Vine. The small and abundant spore masses are irregularly scattered over the whole of the under-surface.—*Hooker*, *Species Filicum*, v., p. 73, t. 285B.

P. lachnopodium—lach-nop-od′-ĭ-um (downy-footed), *J. Smith.*

A very ornamental, stove species, native of Jamaica, and said by Lowe to have been introduced into the Royal Gardens, Kew, in 1843. Its fronds,

deltoid and bi- or tripinnatifid (in shape of the Greek delta, Δ, and twice or thrice divided half-way to the midrib), are 2ft. to 5ft. long, and furnished with spear-shaped leaflets 9in. to 12in. long, the stalks of which are densely covered with scales of a reddish-brown colour. The round and numerous but small spore masses are disposed in one row on each side of, and close to, the midvein of each fertile leafit.—*Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Lowe*, *Ferns British and Exotic*, i., t. 33.

P. (Goniophlebium) lachnopus — Go-nĭ-oph-leb′-ĭ-um ; lach′-nop-us (having a downy foot or stalk), *Wallich.*

This greenhouse species, native of Northern India, and found, according to Beddome, in Nepaul and Khasya at elevations varying between 4000ft. and 6000ft., in Simla and Kumaon at 7000ft., and in Sikkim up to 11,000ft., is totally distinct from the preceding one. Its simply-pinnate fronds, produced from a wide-creeping rhizome densely clothed with black, bristly scales, and borne on slender, naked stalks 2in. to 4in. long, are of a flaccid nature, 1ft. to 1½ft. long, 3in. to 4in. broad, and cut down nearly or quite to the rachis into slightly-toothed leaflets of a soft, papery texture, and naked on both sides. The spore masses are disposed in single series.—*Hooker*, *Species Filicum*, v., p. 25 ; *Second Century of Ferns*, t. 52. *Beddome*, *Ferns of British India*, t. 163.

P. (Phymatodes) laciniatum—Phy-mat-o′-dēs ; lac-in-ĭ-a′-tum (fringed), *Blume.*

A stove species, native of Java, with a wide-creeping rhizome and pinnatifid fronds of a somewhat leathery texture, 1ft. to 1½ft. long, 1ft. or more in breadth, cut down throughout to a narrowly-winged rachis into sharply-pointed lobes, slightly undulated at their edges and naked on both sides. The sori (spore masses) are immersed and disposed in one row on each side of the midvein.—*Hooker*, *Species Filicum*, v., p. 87.

P. (Phegopteris) lævigatum—Phe-gop′-ter-is ; læ-vig-a′-tum (smooth), *Baker.*

A stove species, of medium dimensions, native of Peru, with spear-shaped fronds bipinnatifid (twice divided more than half-way to the midrib), 1½ft.

long, 3in. to 4in. broad, and borne on naked, shining stalks of a peculiar purplish colour. The numerous loose leaflets are opposite, 1½in. to 2in. long, and cut down to a narrow wing into close, blunt lobes of a parchment-like texture, light green in colour, and smooth on both sides. The sori are nearly oblong.—*Hooker*, *Synopsis Filicum*, p. 505.

P. (Phymatodes) lanceolatum — Phy-mat-o′-dēs ; lan-cĕ-ol-a′-tum (spear-shaped), *Linnæus.*

This distinct, stove species has a remarkably wide range of habitat, for it is found in numerous places from the West Indies and Panama to Brazil ; in Juan Fernandez, the Sandwich and Mascarene Islands, Zambesi Land, Cape Colony, St. Helena, and the Guinea Coast ; while Beddome gives it as a native of the Neilgherries, and states that it is common in woods about Ootacamund. Its wide-creeping rhizome, of a wiry nature and covered with bright rusty-brown scales, produce simple (undivided) fronds 3in. to 9in. long, ¼in. to 1in. broad, and gradually narrowed to both ends ; these are of a leathery texture and more or less thickly coated on both sides, especially on the under-one, with fine scales. The large, immersed sori (spore masses) are placed half-way between the midrib and the edge. Fig. 46 is reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 56. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Beddome*, *Ferns of Southern India*, t. 181.



Fig. 46. Polypodium lanceolatum (⅓ nat. size).

P. lanigerum—la-nig′-er-um (woolly), *Eaton.*

A greenhouse species, of little decorative value, with flaccid, pendent fronds, 6in. to 9in. long, cut down to the rachis into blunt, small leaflets of

a soft, papery texture, and thinly coated with soft hairs on both sides. It is a native of Venezuela. *P. concinnum* is identical with this species.—*Hooker*, *Species Filicum*, iv., p. 189.

P. lasiolepis—las-ĭ-ol′-ep-is (rough with scales), *Mettenius.*

A small-growing, stove species, of botanical interest only, with fronds 2in. to 5in. long, 1½in. broad, pinnate, and covered on both surfaces with short, fine, brown, hair-like scales. It is a native of Martinique and Guadeloupe.—*Hooker*, *Synopsis Filicum*, p. 330.

P. lasiostipes—las-ĭ-os′-tip-ēs (having rough, hairy stalks), *Mettenius.*

This stove species, native of New Caledonia, is of little decorative value. It is readily distinguished by the nature of its stalks, which are tufted, very short, and clothed with short, stiff, blackish hairs. — *Hooker*, *Synopsis Filicum*, p. 327.

P. (Goniophlebium) latipes—Go-nĭ-oph-leb′-ĭ-um ; la′-tip-ēs (broad-footed). A variety of *P. loriceum.*

P. (Phymatodes) Lehmanni—Phy-mat-o′-dēs ; Leh-man′-ni (Lehmann's), *Mettenius.*

This stove species, native of Burmah and Darjeeling, produces, from a wide-creeping rhizome of a woody nature, its pinnate fronds, which are 1ft. to 2ft. long, 8in. to 10in. broad, and borne on firm, erect, naked stalks 6in. to 9in. long. The leaflets, 4in. to 5in. long, are sharply pointed and smooth or slightly undulated at the edges ; they are of a somewhat leathery texture, naked on both sides, and each bears two rows of sori (spore masses). —*Hooker*, *Synopsis Filicum*, p. 369. *Beddome*, *Ferns of British India*, t. 260.

P. (Phymatodes) leiorhizon—Phy-mat-o′-dēs ; lei-ŏ-rhi′-zon (having a smooth rhizome), *Wallich.*

This is a robust-growing, greenhouse species, native of Northern India, where it grows up to 7000ft. elevation, and, according to Beddome, found on the Anamallay Mountains at 4300ft. elevation. Its very thick rhizome is clothed with egg-shaped scales, and its fronds, 2ft. to 4ft. long and 1ft. to 2ft. broad, are borne on firm, erect stalks, also 1ft. to 2ft. long. Their leaflets

are 6in. to 12in. long, narrowed at the base, and of a somewhat leathery texture. The slightly-immersed spore masses are disposed in a row near the midrib on each side.—*Hooker*, *Species Filicum*, v., p. 91 ; *Filices Exoticæ*, t. 25. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Beddome*, *Ferns of Southern India*, t. 174.

P. (Phymatodes) Lenormandi — Phy-mat-o′-dēs ; Len-or-man′-di (Lenormand's), *Baker.*

A stove species, native of Mount Mu, New Caledonia, with oblong, simply-pinnate fronds 1½ft. to 2ft. long, 1ft. broad, borne on grey stalks 6in. to 9in. long and of a glossy nature. The strap-shaped, blunt, closely-set leaflets are dilated at the base ; they are of a somewhat leathery texture, and naked on both surfaces. The spore masses are disposed in a distant row near the edge of the leaflets, in which they are deeply immersed, and upon the upper surface of which they form nipple-like protuberances.—*Hooker*, *Synopsis Filicum*, p. 514.

P. (Goniophlebium) lepidopteris—Go-nĭ-oph-leb′-ĭ-um ; lep-id-op′-ter-is (scaly-winged), *Kunze.*

This stove species, native of Mexico, Peru, and Brazil, is very variable. The original or commonest form is provided with a stout, wide-creeping rhizome of a woody nature, densely clothed with greyish scales. It has fronds 6in. to 18in. long, 1½in. to 3in. broad, borne on rigid, erect, densely-scaly stalks 1in. to 4in. long, and cut down to the rachis into horizontal, entire leaflets, the lower ones being reduced very gradually. Their texture is very thick, and they are covered on both sides, the lower very thickly, with rusty-coloured or white hairs and scales. The sori (spore masses), situated on the upper half of the frond, are round, very large, of a yellowish-red colour, and protrude through the scales.—*Hooker*, *Species Filicum*, iv., p. 212.

P. l. rufulum—ru′-ful-um (reddish), *Presl.*

In this variety, which is of Mexican origin, the scales of the rhizome are of a bright reddish-brown colour, and the leaflets, ½in. broad and blunt, are much twisted.—*Hooker*, *Synopsis Filicum*, p. 346. *Nicholson*, *Dictionary of Gardening*, iii., p. 190.

P. l. sepultum—sep-ul′-tum (enclosed), *Kaulfuss.*

This distinct and handsome variety, better known in commerce under the names of *Lepicystis sepultum* and *Goniophlebium sepultum*, is a Brazilian form which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841. Its spear-shaped, somewhat pendulous fronds, 1ft. to 1½ft. long, are of a deep green colour, but so densely covered on both sides with narrow, fringed, silvery scales as to give them a whitish appearance, with which the particularly bright colour of the spore masses forms a striking contrast.—*Hooker*, *Synopsis Filicum*, p. 346. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Lowe*, *Ferns British and Exotic*, i., t. 34A.

P. leucosorum—leu-cos-o′-rum (having white sori), *Bojer.*

A stove species, of small dimensions, native of Mauritius and Bourbon, with fronds 1ft. long, 1½in. to 2in. broad, borne on rigid stalks 4in. to 6in. long, of a dark brown colour, and produced from a short-creeping rhizome; they are cut down within a short distance of the rachis into blunt, entire, spear-shaped lobes of a leathery texture and naked on both sides. The most distinguishing feature resides in the large, prominent sori (spore masses), disposed in two rows, appearing when young as white as chalky dots.—*Hooker*, *Species Filicum*, iv., p. 198; *Icones Filicum*, t. 942.

P. (Phymatodes) leucosporum — Phy-mat-o′-dēs; leu-cos′-por-um (having white spores), *Klotzsch.*

In this distinct, greenhouse species the fronds are produced from a wide-creeping, very scaly rhizome of a woody nature, and borne on firm, erect stalks 2in. to 8in. long; they are 4in. to 8in. long, 2in. to 3in. broad, and have their upper part bluntly sinuated and their lower part cut more than half-way down into blunt lobes of a leathery texture. The upper surface is slightly and the lower surface densely coated with minute scales of a rough nature. The large and prominent sori (spore masses) are disposed in one row on each side of the midvein.—*Hooker*, *Species Filicum*, v., p. 76.

P. ligulatum—lig-ul-a′-tum (strap-shaped), *Baker.*

A small-growing, stove species, of botanical interest only, native of Fiji. —*Hooker*, *Synopsis Filicum*, p. 320.

P. (Phymatodes) Lindbergii—Phy-mat-o′-dēs ; Lind-berg′-ĭ-i (Lindberg's), *Mettenius.*

This stove species, native of Brazil, is provided with a very wide-creeping rhizome, which keeps close to the surface of the ground and is clothed with bright brown scales. Its fronds, quite stalkless and gradually narrowed to both ends, are 6in. to 8in. long, 1in. to 1½in. broad, of a thin, papery texture, bright green in colour, and finely hairy on both sides. The round and conspicuous sori (spore masses) are disposed in a single row nearer the midrib than the margin.—*Hooker*, *Synopsis Filicum*, p. 358.

P. (Phymatodes) Lindleyanum — Phy-mat-o′-dēs ; Lind-ley-a′-num (Lindley's). This is a form of *P. palmatum.*

P. (Phymatodes) lineare—Phy-mat-o′-dēs ; li-nĕ-a′-rĕ (linear), *Thunberg.*

This greenhouse species is very common in India, where it is said to be found up to 10,000ft. elevation ; it is also a native of Japan, the Malayan Islands, Natal, Angola, &c. Its fronds, 6in. to 12in. long and ½in. to 1in. broad, are produced from a wide-creeping rhizome of a woody nature ; they are entire (undivided), gradually narrowed to both ends, of a somewhat leathery texture, and almost naked on both sides. The large and prominent sori (spore masses) form a single row nearer the midrib than the edge ; they are distinctly immersed, and when young are covered with copious scales.—*Hooker*, *Garden Ferns*, t. 14. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Beddome*, *Ferns of Southern India*, t. 180.

P. l. simplex—sim′-plex (simple), *Swartz.*

In this variety the fronds are larger—sometimes 1½ft. long and 2in. broad—their texture is thinner, and the veins are more distinct.—*Hooker*, *Synopsis Filicum*, p. 354.

P. (Niphobolus) Lingua—Niph-ob′-ol-us ; Lin′-gua (tongue-like), *Swartz.*

This greenhouse species, native of China, Japan, Ceylon, and Northern India, where it occurs at 5000ft. elevation, is a very distinct plant, provided with a wide-creeping rhizome, from which its simple (undivided) fronds are produced in abundance. These fronds, borne on firm, erect, round stalks 3in. to 6in. long, are of a leathery texture, 4in. to 8in. long, 1in. to 4in. broad,

often sharp-pointed at their extremity, narrowed and sometimes rounded at the base. They are of a dark green colour on their upper surface, while their underside is rendered very attractive through the small, light brown or drab-coloured scales with which it is covered. The fertile fronds, although of nearly the same length as the barren ones, are contracted and partly covered by the sori, which are large, prominent, of a peculiar reddish-brown colour, and disposed in close rows of four to six between the midvein and the edge. According to Lowe, this species was introduced into the Royal Gardens, Kew, in 1830, though it had been known in England since 1817. Fig. 47 is reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author. —*Hooker*, *Species Filicum*, v., p. 49. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Lowe*, *Ferns British and Exotic*, i., t. 22. *Beddome*, *Ferns of Southern India*, t. 240.



Fig. 47. Polypodium Lingua (¼ nat. size).

P. L. corymbiferum—cor-ymb-if′-er-um (corymb-bearing), *Moore*.

A Chinese variety of the above species, which, although of the same dimensions, is entirely dissimilar in other respects; indeed, its foliage is of such a grotesque contour, that there is hardly any character left resembling that of the typical species. Whilst the fronds of the type are simple and spear-shaped, those of this variety have their summit several times branched or lobed, the point of each division being furnished with a large crest or tassel, which gives the plant a very peculiar, and at the same time a very ornamental and unique, appearance. When grown in a shallow pan of medium dimensions it makes a very handsome specimen. Fertile fronds are seldom met with in this variety, and although spores of it have been several times sown by us, they have never produced anything but the typical species with plain fronds. This variety has also been lately imported from Japan, where it is said to be plentiful.—*G. Schneider*, *The Garden*, 1884, p. 189.

P. L. Heteractis—He-ter-ac′-tis (Heteractis), *Mettenius.*

This is a Himalayan form, and differs from the typical Japanese *Lingua* principally by its broader oblong-spear-shaped fronds (Fig. 48), which are also of a more fleshy texture; further, their under-side is covered with a much thicker coating of creamy-coloured down, which gives them a more mealy appearance.—*Hooker*, *Synopsis Filicum*, p. 512. *Nicholson*, *Dictionary of Gardening*, iii., p. 190.



Fig. 48. Polypodium Lingua Heteractis
(¼ nat. size).

P. (Drynaria) Linnæi—Dryn-a′-rĭ-a; Lin-næ′-i (Linnæus'), *Bory.*

A stove species, much in the way of the better-known *P. quercifolium*, and a native of Ceylon, Queensland, and the Solomon and Fiji Islands. Its barren and fertile fronds, produced from a stout rhizome, are totally different; the former being stalkless, brown, rigid, and bluntly lobed, while the fertile ones, which are long-stalked and usually measure 2ft. to 3ft. in length and 6in. to 12in. in breadth, are cut down nearly to the rachis into entire, spear-shaped lobes of a rigid texture and naked on both sides. The small and abundant sori (spore masses) are scattered over the whole of their under-side.—*Hooker*, *Synopsis Filicum*, p. 368. *Beddome*, *Ferns of British India*, t. 315.



Fig. 49. Polypodium Lobbianum
(⅛ nat. size).

P. (Dipteris) Lobbianum — Dip′-ter-is; Lob-bĭ-a′-num (Lobb's), *Hooker.*

This stove species, also known under the name of *P. bifurcatum*, is a native of Mount Ophir, Malaysia, Sarawak, and Borneo. Its fronds, 1ft. long and 1ft. broad, have their main lobes, which reach down to the base, three or four times

forked, the ultimate segments being linear and entire ; they are of a leathery texture, dark brownish-green above, pale and tawny underneath. The sori (spore masses) are disposed in a single row on each side of and very near the midvein. Fig. 49 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 100. *Beddome*, *Ferns of British India*, t. 233.

P. (Phymatodes) lomarioides — Phy-mat-o′-dēs ; lo-ma-rĭ-ŏ-i′-des (Lomaria-like), *Kunze*.

This stove species, of medium dimensions, native of Malaysia, Formosa, and the Philippines, is readily distinguished by its peculiar, thick, wide-spreading rhizome, thickly clothed with small scales attached by their centre. Its fronds, borne on firm, erect stalks 2in. to 4in. long, are 1ft. to 1½ft. long and 4in. to 6in. broad. The barren ones are cut down within ¼in. of the rachis into close, oblong, entire, blunt lobes ; the fertile ones are cut nearly to the rachis throughout, with more numerous lobes, all of a leathery texture, and naked on both sides. The round or oblong sori (spore masses) are completely immersed, and are disposed in two close rows near the midrib.—*Hooker*, *Species Filicum*, v., p. 79.

P. (Phymatodes) longifolium—Phy-mat-o′-dēs ; long-if-ol′-ĭ-um (long-fronded), *Mettenius*.

A stove species, native of Malaysia and the Philippines. From a short-creeping, woody rhizome covered with nearly black scales, are produced entire (undivided) fronds 1ft. to 2ft. long, ½in. to 1½in. broad, sharp-pointed, often revolute, the lower part very gradually narrowed into a short, firm stem. They are of a leathery texture, with their under-surface naked or slightly scaly. The oblong sori (spore masses) are quite immersed, and are placed end to end a space from one another in a line close to the edge, the capsules being mixed with minute, stalked scales.—*Hooker*, *Species Filicum*, v., p. 60 ; *Second Century of Ferns*, t. 87 ; *Filices Exoticæ*, t. 20. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Lowe*, *Ferns British and Exotic*, ii., t. 41. *Beddome*, *Ferns of British India*, t. 7.

P. (Phymatodes) longipes—Phy-mat-o′-dēs ; long′-ip-ēs (long-stalked). This is simply a garden form of *P. Phymatodes*.

P. longipinnulatum—long-ip-in-nul-a′-tum (having long pinnules, or leafits), *Fournier*.

Notwithstanding its specific name, this stove species, native of Mexico, has fronds simply pinnate (only once divided to the midrib). They are spear-shaped, 3ft. long, and 1ft. broad, and their leaflets, strap-shaped and ½in. broad, are comparatively long, sharp-pointed at the extremity, and narrowed at the base. Both surfaces are of a light green colour, and the spore masses are round and yellowish.—*Hooker*, *Synopsis Filicum*, p. 510.

P. (Phymatodes) longissimum—Phy-mat-o′-dēs ; long-is′-sim-um (very long), *Blume*.

This stove species, of singular appearance and somewhat large dimensions, has a very wide range of habitat, being found in Northern India, on the Neilgherries, in Malaysia, in the Philippines, and in Formosa. It is provided with a wide-creeping rhizome, densely coated with large, egg-shaped, brown scales, from which its fronds, borne on firm stalks of a glossy nature, are produced. These fronds are 1ft. to 4ft. long, 6in. to 12in. broad, and cut down very nearly to the rachis into numerous nearly entire lobes 4in. to 6in. long, 1½in. broad, of a leathery texture, and naked on both sides. The sori (spore masses) are disposed in single rows near the midrib, and form distinct, nipple-like protuberances on the upper surface.—*Hooker*, *Species Filicum*, v., p. 80. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Lowe*, *Ferns British and Exotic*, ii., t. 47.

P. (Goniophlebium) loriceum — Go-nĭ-oph-leb′-ĭ-um ; lo-ri′-cĕ-um (armour-clad), *Linnæus*.

The habitat of this stove species extends from Mexico and the West Indies to Brazil and Chili. Its stout, wide-creeping rhizomes are very prettily spotted, and produce fronds 1ft. to 1½ft. long and 4in. to 6in. broad, having nearly entire, sometimes sickle-shaped leaflets 2in. to 3in. long and enlarged at the base on the upper side. The fronds are of a somewhat leathery texture, usually naked on both sides, and the spore masses, of a pale yellow colour, are disposed in either one or two rows on each side of the midvein.—*Hooker*, *Species Filicum*, v., p. 21. *Nicholson*, *Dictionary of Gardening*, iii., p. 190. *Lowe*, *Ferns British and Exotic*, ii., t. 30.

P. l. latipes—la′-tip-ēs (broad-footed), *Langsdorff and Fischer.*

This variety, which in gardens is frequently found under the names of *P. Catherinæ*, *P. harpeodes*, and *P. vacillans*, is very distinct from the species. Its much larger fronds are slenderer and of a pendulous habit, though of a texture similar to those of *P. loriceum;* their leaflets, much enlarged on both sides at the base, are of a dull green colour on both sides, and the small, yellowish sori (spore masses) are disposed in one distinct and regular row on each side of the midvein. It is a native of Brazil and St. Catharine, and, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841. —*Hooker*, *Synopsis Filicum*, p. 343. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Lowe*, *Ferns British and Exotic*, ii., t. 39.

P. (Campyloneuron) lucidum — Camp-yl-on-eur′-on ; lu′-cid-um (shining), *Bory.*

A very distinct, stove species, of small dimensions, native of Venezuela and Brazil. Its short-creeping rhizomes produce fronds 6in. to 12in. long, ½in. to ¾in. broad, narrowed to both ends, of a rigid texture, and very glossy on both sides. The sori (spore masses) are not very abundant; they are of a pale yellow colour and are confined to the upper part of the frond. *P. nitidum* is synonymous with this species.—*Hooker*, *Species Filicum*, v., p. 41. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. (Phymatodes) lycopodioides—Phy-mat-o′-dēs ; lyc-op-od-ĭ-ŏ-i′-des (Lycopodium-like), *Linnæus.*

This very dwarf, but exceedingly pretty, stove species, native of the West Indies and Tropical America, was, according to Lowe, introduced into the Royal Gardens, Kew, in 1821. Its simple (undivided) fronds, produced from a wide-creeping rhizome, are of two kinds, and either short-stalked or stalkless. The barren ones, 2in. to 4in. long and ½in. to 1in. broad, are often blunt and gradually narrowed at the base, while the fertile ones are longer and narrower. Both kinds are of a leathery texture and of a shining nature, and the spore masses are disposed in one row along their margins. This species is also known as *P. venosum.*—*Hooker*, *Synopsis Filicum*, p. 357. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Lowe*, *Ferns British and Exotic*, ii., t. 26.

P. l. owariense—ow-a-rĭ-en′-sĕ (Owarian), *Desvaux.*

Notwithstanding its name, this variety, according to Lowe, is a native of Sierra Leone and Guinea, having been introduced into this country in 1849. It differs from the species principally by the shape of its barren fronds, which are shorter, oval, and bluntly pointed (Fig. 50). As is the case with the species, the fertile fronds are a little longer and narrower; they are also bluntly undulated. Both kinds are of a deep bluish-green colour and of a smooth and shining nature.—*Nicholson, Dictionary of Gardening*, iii., p. 191. *Lowe, Ferns British and Exotic*, ii., t. 62.



Fig. 50. Barren Frond of Polypodium lycopodioides owariense (nat. size).

P. l. salicifolium — sal-ic-if-ol′-ĭ-um (Willow-leaved), *Willdenow.*

In this pretty and free-growing variety, the fronds, longer and narrower than those of the species, are nearly or quite uniform, both kinds being about 5in. long, scarcely ½in. broad, and beautifully veined.—*Hooker, Species Filicum*, v., p. 34.

P. macrocarpum—mac-roc-ar′-pum (large-fruited), *Presl.*

This stove species, of small dimensions, native of Bolivia and Chili, is of little decorative value. Its leathery fronds, erect or nearly so, are only about 6in. long, including the stalk; it is, however, an interesting plant on account of the abundant and large spore masses, which protrude among the dense coat of scales on the under-side of the fronds.—*Hooker, Species Filicum*, iv., p. 215.

P. (Dictyopteris) macrodon — Dic-tў-op′-ter-is; mac′-rod-on (large-toothed), *Reinwardt.*

This stove species, of large dimensions, better known in gardens under the name of *P. Cumingianum*, is a native of the Philippines, Malaysia, the Solomon Islands, and Fiji, and, according to Nicholson, it was introduced into this country in 1840. The fronds, 2ft. to 3ft. long and 1ft. to 1½ft. broad, are borne on a stalk 1ft. or more in length and slightly scaly below; their upper portion is deeply pinnatifid, and below they are provided with numerous



Osmunda regalis japonica corymbifera

(¼ nat. size).

spear-shaped leaflets, cut down to a narrow wing into deeply-cleft, close, spear-shaped leafits of thin texture and naked on both sides. The small and numerous spore masses are disposed in rows near the midveins.—*Hooker*, *Species Filicum*, v., p. 103. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. (Phegopteris) macrophyllum — Phe-gop′-ter-is ; mac-roph-yl′-lum (large-leaved), *Hooker*.

This gigantic, stove species, native of the Andes of North-east Peru, has fronds 5ft. to 6ft. long and 2ft. to 3ft. broad, borne on stalks 4ft. long, ½in. thick, and clothed with spear-shaped scales. They are only pinnatifid, their lowest leaflets, 16in. long and 2½in. broad, being cut down to a broadly-winged rachis into close, slightly-toothed, somewhat sickle-shaped lobes of a thin, papery texture, dark green in colour, and naked on both sides, but showing numerous pellucid (transparent) dots. The sori (spore masses) are disposed in one row on each side of and close to the midvein.—*Hooker*, *Species Filicum*, iv., p. 241.

P. (Phegopteris) macropterum — Phe-gop′-ter-is ; mac-rop′-ter-um (large-winged), *Kaulfuss*.

A stove species, of large dimensions, native of Brazil, producing from a somewhat arborescent trunk fronds 4ft. to 6ft. long, borne on strong, angular, smooth stalks 2ft. long. These fronds are furnished with leaflets 6in. to 9in. long and 2in. broad, with entire, sickle-shaped lobes reaching three-quarters of the way to the midrib. The sori (spore masses) are disposed along the midvein.—*Hooker*, *Species Filicum*, iv., p. 258. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. madrense—mad-ren′-sĕ (from Sierra Madre), *J. Smith*.

A small-growing, stove species, native of North-west Mexico, and of little decorative value. It is somewhat closely related to *P. plebeium*, and has fronds of a leathery texture, seldom more than 5in. long and 2in. broad.—*Hooker*, *Species Filicum*, iv., p. 214. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. (Campyloneuron) magnificum—Camp-yl-on-eur′-on ; mag-nif′-ic-um (magnificent). A garden synonym of *P. Fendleri*.

P. (Phegopteris) Mannianum—Phe-gop′-ter-is ; Man-nĭ-a′-num (Mann's), *Hooker.*

This distinct and much-divided, greenhouse species, native of Fernando Po, has spear-shaped fronds 1ft. long, 4in. to 5in. broad, borne on tufted stalks 6in. to 9in. long and of a glossy nature. Their lowest leaflets, which are the largest, are 2in. to 3in. long, and cut down to the rachis below into broadly-triangular leafits, with deep, blunt, entire lobes. The texture is soft and papery, and the sori (spore masses) are disposed two to eight to a leafit.—*Hooker*, *Species Filicum*, iv., p. 253.

P. (Phymatodes) marginatum — Phy-mat-o′-dēs ; mar-gin-a′-tum (margined), *Baker.*

A stove species, of medium dimensions, native of the Isle of Pines and New Caledonia. Its fronds, produced from a firm, wide-creeping rhizome, and borne on naked stalks 1in. to 2in. long, are narrow-strap-shaped, undivided, 1ft. to 1½ft. long, ½in. to ¾in. broad, gradually narrowed to both ends, of a rigidly leathery texture, bright green, and naked on both sides. The oblong, immersed sori (spore masses) are disposed on the margin and parallel with the edge, where they are placed ¼in. to ½in. apart.—*Hooker*, *Synopsis Filicum*, p. 513.

P. (Grammitis) marginellum—Gram-mi′-tis ; mar-gin-el′-lum (slightly-margined), *Swartz.*

This small-growing, stove species, of more botanical interest than decorative value, has a very wide range of habitat, being found in the West Indies and Guatemala to Guiana and Peru, St. Helena, the Cape Verde Islands, &c. Its strap-shaped fronds, 3in. to 6in. long and ⅛in. to ⅙in. broad, are blunt at the point and gradually taper downwards into a short stem ; they are of a leathery texture, naked or slightly hairy on both surfaces, and margined with a distinct, black line. The copious sori (spore masses) are closely set, oval or oblong, and disposed in rows nearer the midrib than the edge.—*Hooker*, *Species Filicum*, iv., p. 164. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. Martensii—Mar-tens′-ĭ-i (Martens'), *Mettenius.*

The fronds of this greenhouse species, native of Mexico, are produced from a stout, wide-creeping rhizome clothed with large, parchment-like, bright

brown scales, and borne on firm, erect stalks 1in. to 2in. long. The leafy portion, 8in. to 12in. long and 3in. to 4in. broad, is cut down to the rachis into numerous horizontal leaflets of a thin, papery texture and finely hairy on both sides. The sori (spore masses) are disposed twelve or more on each side of the midvein.—*Hooker*, *Species Filicum*, iv., p. 207. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. (Goniophlebium) Matthewsii—Go-nī-oph-leb′-ĭ-um ; Mat-thews′-ĭ-i (Matthews'), *Mettenius*.

This is a well-marked, stove species, found on the Andes, from Colombia to Peru, characterised by its very pendulous habit and the leathery nature of its fronds, which are 6in. to 18in. long, 2in. to 5in. broad, cut down nearly to the rachis into numerous entire leaflets 1in. to 3in. long, with generally a broad, rounded sinus (depression) between them. They are borne on stalks 4in. to 6in. long, clothed with soft, spreading, brown hairs ; their under-surface is clothed with hairs like those of the stalks, and the spore masses are disposed in single series.—*Hooker*, *Species Filicum*, v., p. 20.

P. (Phegopteris) Maximowiczii — Phe-gop′-ter-is ; Max-im-ow-ic′-zĭ-i (Maximowicz's), *Baker*.

A greenhouse or nearly hardy species, native of Nagasaki, Japan, with spear-shaped, simply-pinnate (once-divided) fronds 9in. to 15in. long, 1in. broad at their middle, narrowed to both ends, and often rooting at the tip. They are borne on tufted, naked stalks 2in. to 3in. long, and are furnished with stalkless, spear-shaped leaflets, auricled (eared) on the upper and cuneate (wedge-shaped) on the lower side at the base. The texture is thin but firm, and both the surfaces are naked and of a dark green colour. The spore masses are terminal on the ends of the forked veins of the auricles.—*Hooker*, *Synopsis Filicum*, p. 504.

P. mediale—med-ĭ-a′-lĕ (medial), *Baker*.

This is a very small-growing, stove species, with rigidly leathery fronds seldom more than 2in. long and of little decorative value. The oblong, oblique sori (spore masses) reach from the top nearly to the base of the frond, where they form a line nearer the edge than the midrib. It is a native of Ceylon. —*Hooker*, *Synopsis Filicum*, p. 507.

P. (Dictyopteris) megalocarpum—Dic-tŷ-op′-ter-is ; meg-al-oc-ar′-pum (large-fruited), *Hooker.*

This stove species, native of Java, somewhat resembles *P. difforme* in general habit. Its fronds, 2ft. to 3ft. long and 1ft. or more in breadth, have their upper part deeply pinnatifid, with spear-shaped, pinnatifid lobes ; below this there are five or six pairs of distinct leaflets, the lowest 6in. to 9in. long and 3in. broad, with entire, blunt, oblong lobes ¼in. broad. They are of a somewhat leathery texture, and the large and prominent spore masses are disposed in two distinct rows.—*Hooker*, *Species Filicum*, v., p. 102.

P. melanopus—mel-an′-op-us (black-footed), *Hooker and Greville.*

A very dictinct, stove species, native of the Andes of Ecuador, with fronds borne on slender, black, naked stalks 3in. to 4in. long, and bent so that the fronds hang down. These fronds are 7in. to 8in. long, 2in. to 3in. broad, and cut down to the rachis into narrow, bluntish, slightly-notched leaflets of a somewhat leathery texture, naked on both sides, and upon which the spore masses are disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 200.

P. (Phymatodes) Melleri—Phy-mat-o′-dēs ; Mel′-ler-i (Dr. Meller's), *Baker.*

A small-growing, stove species, of purely botanical interest, native of Madagascar.—*Hooker*, *Synopsis Filicum*, p. 359.

P. (Phymatodes) membranaceum—Phy-mat-o′-dēs ; mem-bra-na′-cĕ-um (membranous), *Don.*

This stove species, native of India, is easily recognised through the peculiar thin texture of its fronds. It is said to be found at various elevations up to 6000ft., and, according to Beddome, it occurs in the Neilgherries and Anamallay Mountains, Wynad, Coorg, South Canara Ghâts, and other mountainous tracts, where it grows on trees from 2000ft. elevation upwards. The fronds are produced from a stout rhizome clothed with egg-shaped scales, transparent, and of a lurid green colour ; they are borne on firm, erect stalks 1in. to 4in. long, and measure from 1ft. to 3ft. long and 2in. to 6in. broad in their centre, being gradually narrowed to both ends. The texture is very thin, and the spore masses are disposed in two rather irregular rows near the main veins.—*Hooker*, *Species Filicum*, v., p. 70. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Beddome*, *Ferns of Southern India*, t. 177.

P. m. grandifolium—gran-dif-ol′-ĭ-um (large-leaved), *Wallich.*

In this variety the fronds are larger than in the type, and the more copious spore masses are irregularly scattered over the whole of the lower surface.—*Hooker*, *Synopsis Filicum*, p. 360.

P. (Goniophlebium) menisciifolium — Go-nĭ-oph-leb′-ĭ-um ; me-nis′-cĭ-if-ol′-ĭ-um (Meniscium-leaved), *Langsdorff and Fischer.*

This is a strong-growing, stove species, native of Panama, Trinidad, and Brazil, and, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841. Its fronds, 2ft. to 3ft. long and 1ft. or more in breadth, are borne on firm, erect, smooth stalks 1ft. to 2ft. long. They are composed of an entire (undivided) terminal leaflet, 6in. to 9in. long and 1½in. to 2in. broad, and of numerous smaller ones on each side of the rachis, all narrowed to the base. Their texture is somewhat leathery, they are naked on both sides, and the prominent spore masses are deeply immersed on the upper side.—*Hooker*, *Species Filicum*, v., p. 27. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. (Goniopteris) meniscioides — Go-nĭ-op′-ter-is ; me-nis-cĭ-ŏ-ĭ′-dēs (Meniscium-like), *Liebmann.*

A strong-growing species, native of Mexico, with fronds 2ft. to 4ft. long and 1ft. to 2ft. broad, borne on strong, upright, quite naked stalks 1ft. to 2ft. long. These fronds are composed of a terminal leaflet and from six to twelve pairs of lateral ones, the lowest stalked, 1ft. long, 1½in. broad, sharp-pointed at their extremity, and with the edge nearly entire ; they are of a rigid texture and quite naked on both sides, and the sori (spore masses) are disposed in either single or double rows between them.—*Hooker*, *Synopsis Filicum*, p. 314.

P. meridense—mer-id-en′-sĕ (native of Merida), *Klotzsch.*

A stove species, of medium dimensions and of little decorative value, native of South America.—*Hooker*, *Synopsis Filicum*, p. 333.

P. (Drynaria) Meyenianum—Dryn-a′-rĭ-a ; Mey-en-ĭ-a′-num (Meyen's), *Schott.*

This stove species, commonly known in gardens as the "Bear's-paw Fern," is as ornamental as it is distinct, and is a native of the Philippine Islands,

where it is said to grow on branches of trees. It is provided with a rhizome of a particularly stout nature, and densely clothed with narrow, crisped scales



Fig. 51. Polypodium Meyenianum
(much reduced).

½in. long and of a bright rusty-brown colour. From these singular-looking rhizomes are produced fronds 2ft. to 3ft. long and 8in. to 12in. broad; their

lower part is cut down nearly to the midrib into oblong, blunt, entire lobes, while their upper portion is furnished with numerous close leaflets 4in. to 6in. long. The fertile part of the frond, which usually extends about one-third of its length, consists of narrow leaflets, having the appearance of a firm midrib with a row of small, round lobes on both sides, each bearing a bright yellow spore mass that covers it. This fructification hangs out so prominently that it gives the plant quite the appearance of what is commonly called a "flowering Fern" (Fig. 51). In gardens this curious and beautiful species is sometimes met with under the names of *Aglaomorpha Meyeniana* and of *Drynaria philippinense.—Hooker*, *Species Filicum*, v., p. 94. *Nicholson*, *Dictionary of Gardening*, iv., p. 592.

As a rule, the Bear's-paw Fern is a difficult plant to manage in pots, but it thrives apace when treated like a Platycerium—grown either on a stump, in a shallow pan, or in a hanging basket. Care should be taken not to bury its rhizomes. The soil should be pure fibrous peat, on which the rhizomes should at first be pegged down, free scope being allowed for their extension. Grown in that way, it soon repays any extra trouble bestowed on its culture.

P. millefolium—mil-lef-ol′-ĭ-um (having many fronds), *Blume*.

A much-divided, stove species, of small dimensions, native of Java, with fronds 8in. long and 1½in. broad, borne on stalks 1in. to 3in. long and clothed with spreading, rusty-coloured hairs. The leaflets, ¾in. long and broadly spear-shaped, are cut down to the rachis (stalk of the leafy portion) into narrow-oblong or spoon-shaped leafits, which are ¼in. long and toothed or deeply notched. The fronds are of a firm and somewhat leathery texture, with their under-surface slightly hairy and their spore masses one to each leafit.—*Hooker*, *Synopsis Filicum*, p. 339.

P. minutum—min-u′-tum (small), *Blume*.

A small-growing, stove species, native of Ceylon and the Malayan and Philippine Islands. It has flaccid, pendulous fronds 4in. to 6in. long and ½in. to ¾in. broad, borne on tufted stalks 2in. to 3in. long and clothed with soft, yellowish hairs. The leaflets are barely ⅛in. broad, blunt, slightly notched, and closely set, the lower ones being reduced; they are of a soft, papery texture, clothed on both sides with soft, yellowish hairs, and the spore masses

are disposed one to three on each side of and close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 188.

P. (Phegopteris) molle—Phe-gop′-ter-is ; mol′-lĕ (soft), *Roxburgh.*

This greenhouse species, also known in gardens under the name of *P. Dianæ*, is a native of St. Helena. Its fronds, 2ft. to 3ft. long, 1ft. to 1½ft. broad, and borne on stout stalks 1ft. or more in length, have their leaflets 6in. to 9in. long, 1½in. to 2in. broad, and cut down to a broadly-winged rachis into oblong, entire or notched, blunt lobes ; they are of a somewhat leathery texture, with their under-surface finely hairy. The small and copious spore masses are distant from the midvein.—*Hooker*, *Species Filicum*, iv., p. 234. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

Another plant of totally different characters is sometimes found in gardens under the same name. This is *P.* (*Drynaria*) *molle* of Beddome, which is synonymous with *P. rivale*. *P.* (*Goniophlebium*) *molle*, also of Beddome, is synonymous with *P. Beddomei.*

P. moniliforme—mon-i-lif-or′-me (necklace-shaped), *Lagasca.*

A small-growing, stove species, found along the Andes from Mexico to Peru, producing from a stout, creeping rhizome of a scaly nature fronds 6in. to 9in. long, ¼in. broad, cut down to their midrib into close, entire leaflets of a very leathery nature, naked on both sides. The sori (spore masses) are disposed one to four to each leaflet.—*Hooker*, *Species Filicum*, iv., p. 182 ; *Icones Filicum*, t. 719.

P. morbillosum — mor-bil-lo′-sum (diseased). Synonymous with *P. Heracleum.*

P. Moritzianum—Mor-itz-ĭ-a′-num (Moritz's), *Link.*

In this stove species, native of Venezuela, the fronds, produced from a stout, creeping rhizome, and borne on erect stalks 4in. to 6in. long and of a naked, glossy nature, are upright in habit, 1ft. to 1½ft. long, 3in. to 4in. broad, and cut down nearly or quite to the rachis into close, bluntish, nearly horizontal, undulated leaflets, ¼in. to ½in. long, of a thin, papery texture, and naked on both surfaces. The spore masses are disposed in two long rows on each leaflet.—*Hooker*, *Species Filicum*, iv., p. 202.

P. (Phymatodes) moulmeinensis—Phy-mat-o′-dēs ; moul-mein-en′-sis (native of Moulmein), *Beddome.*

This greenhouse species, found by Parish on the Moulmein Mountains at 5000ft. elevation, is considered by Hooker as either a form of *P. juglandifolium* or closely allied to that species. It is provided with a creeping rootstock, from which its pinnate fronds, 8in. to 10in. long and 6in. to 10in. broad, are produced : they are composed of three pairs of firm, parchment-like leaflets 4in. to 5in. long, ½in. to ¾in. broad, and undulated at the edges. The slightly-sunk sori (spore masses) are disposed one between each of the main veins, half-way between them and the margin.—*Beddome, Ferns of British India*, t. 205.

P. multifidum—mul-tif′-id-um (much-cleft), *Bory.*

A small-growing, stove species, of little decorative value, with leathery fronds barely 3in. long and frequently forked. The large, roundish, and prominent spore masses, when mature, project over their edges. It is a native of Mauritius and Bourbon.—*Hooker, Species Filicum*, iv., p. 174.

P. (Goniopteris) multilineatum—Go-nĭ-op′-ter-is ; mul-til-i-nĕ-a′-tum (having many lines), *Wallich.*

This strong-growing, stove species is, according to Beddome, a native of Sylhet, Sikkim, Assam, Bhotan, Kumaon, &c., and is found up to 3000ft. elevation. Its pinnate fronds, 3ft. to 4ft. long, 1½ft. to 2ft. broad, and borne on firm, erect, naked stalks 2ft. or more in length, are furnished with numerous leaflets sometimes 1ft. long, sharp-pointed at their extremity, of a leathery texture, naked on both sides, and with spore masses disposed in two rows.—*Hooker, Species Filicum*, v., p. 11. *Beddome, Ferns of British India*, t. 231.

P. (Goniopteris) muricatum—Go-nĭ-op′-ter-is ; mu-ric-a′-tum (rough, prickly), *Powell.*

This stove species, of large dimensions, native of Samoa, may be readily distinguished by its grey stalks, 2ft. to 4ft. long, and furnished with fleshy, white glands which, when old, become hard and prickly. The fronds, 2ft. to 4ft. long and narrow-triangular in shape, are furnished with stalkless, strap-shaped, sharp-pointed leaflets having a prickle-like gland at the base ; these

are 6in. to 10in. long and are cut half-way down into bluntish lobes of a rigid and somewhat leathery texture, bright green and naked on both surfaces. The small and closely-set sori (spore masses) are disposed along the margin of the lobes.—*Hooker*, *Synopsis Filicum*, p. 506.

P. (Phymatodes) musæfolium—Phy-mat-o′-dēs ; mu-sæ-fol′-ĭ-um (Musa-leaved), *Blume*.

The fronds of this massive-growing, stove species, native of the Malayan Islands, are rendered very handsome by their conspicuous venation ; they are produced from a woody rhizome clothed with egg-shaped scales of a dull brown colour, and are from 1ft. to 3ft. long, 3in. to 4in. broad, and stalkless. The lower part of the fronds is broadly winged to the very base ; their extremity is sometimes sharp-pointed, but more generally bluntish ; they are mostly simple (undivided), though occasionally pinnatifid or deeply lobed and crowded together, of a leathery texture, and pale green in colour. The very numerous dark, reticulated veins terminate before they reach the edge of the fronds. The small and very abundant sori (spore masses) sometimes cover the whole of the under-surface, upon which they are irregularly scattered. In gardens this species is frequently confounded with *P. Heracleum*.—*Hooker*, *Species Filicum*, v., p. 68. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Lowe*, *Ferns British and Exotic*, ii., t. 31. *Beddome*, *Ferns of British India*, t. 317.

P. myriocarpum—my-rĭ-oc-ar′-pum (many-fruited). This is a variety of *P. pellucidum*.

P. myriophyllum—my-rĭ-oph-yl′-lum (many-leaved), *Mettenius*.

A stove species, native of Peru, with flaccid, pendent fronds 1ft. long, 3in. broad, borne on flexuose (zigzag-bending) stalks 4in. to 6in. long, of a wiry nature, and densely clothed with long, soft, brown hairs. Their leaflets, flexuose and closely set, are cut down to a narrow rachis into narrow lobes of a somewhat leathery texture, slightly hairy underneath. The spore masses are conspicuous through their being broader than the lobes at the base of which they are situated.—*Hooker*, *Species Filicum*, iv., p. 227 ; *Second Century of Ferns*, t. 21.

P. nanum—na′-num (dwarf), *Vieillard.*

This stove species, native of New Caledonia, is of botanical interest only. Its rigid, leathery, dark green fronds are seldom more than 1½in. long, and the oblong spore masses are confined to their upper half, where they are situated near the midrib.—*Hooker*, *Synopsis Filicum*, p. 507.

P. (Goniophlebium) neriifolium—Go-nĭ-oph-leb′-ĭ-um ; ne-rĭ-if-ol′-ĭ-um (Oleander-leaved). Synonymous with *P. brasiliense.*

P. (Phymatodes) nigrescens—Phy-mat-o′-dēs ; nig-res′-cens (blackish), *Blume.*

This strong-growing, stove species, of very distinct appearance, is a native of Ceylon, Malaysia, Fiji, Samoa, and the Friendly Islands ; and according to Beddome, it is found growing in several localities in Southern India. Its fronds, 2ft. to 3ft. long, 1ft. to 1½ft. broad, and borne on firm, erect, glossy stalks 1ft. to 1½ft. long, are produced from a stout, creeping rhizome clothed with egg-shaped scales ; they are cut within ¼in. or ½in. of the rachis into numerous entire, narrow-oblong lobes 6in. to 12in. long, 1in. to 2in. broad, of a somewhat leathery texture, naked on both surfaces, and of a dark green colour. The very conspicuous and ornamental sori (spore masses) are disposed in a single row nearer the midrib than the edge, and are sunk in a deep cavity, which is prominent on the upper surface.—*Hooker*, *Species Filicum*, v., p. 81 ; *Filices Exoticæ*, t. 22. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Beddome*, *Ferns of Southern India*, t. 176.

P. (Phlebodium) nigripes — Phleb-o′-dĭ-um ; nig′-rip-ēs (black-footed), *Hooker.*

A distinct, stove species, native of Venezuela. It is provided with a stout rhizome, covered with black and rigid scales, from which the simply-pinnate fronds, borne on firm, erect stalks nearly 1ft. long, are produced. These are 1ft. long, 6in. to 7in. broad, and cut down nearly or quite to the rachis below into leaflets which are slightly notched towards their bluntish point. The leaflets are of a somewhat leathery texture and rough on their under-surface, and the spore masses are disposed in single rows on each side of the midrib.—*Hooker*, *Species Filicum*, v., p. 17. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. (Goniophlebium) niponicum — Go-nĭ-oph-leb′-ĭ-um ; nip-on′-ic-um (from Nipon), *Mettenius.*

A small-growing, greenhouse species, of little decorative value, with soft, papery fronds, about 5in. long and hairy on both sides. It is a native of Japan.—*Hooker, Synopsis Filicum*, p. 341.

P. (Niphobolus) nitens—Niph-ob′-ol-us ; nit′-ens (shining), *Baker.*

This stove species, native of the Philippines, is of distinct appearance. Its fronds, almost stalkless, 1½ft. to 3ft. long and 3in. to 4in. broad, are sharp-pointed, their lower part being gradually narrowed and their edge entire. They are of a somewhat leathery texture, their upper surface being furnished with scattered, cottony down, and their lower one matted with fine, silky, dark brown hairs and rusty-coloured wool. The very fine spore masses are closely set on the whole under-surface, but fall short of the edge.—*Hooker, Species Filicum*, v., p. 52.

P. nitidum—nit′-id-um (shining). This is synonymous with *P. lucidum.*

P. (Phymatodes) normale—Phy-mat-o′-dēs ; nor-ma′-lĕ (normal), *Don.*

A stove species, of medium dimensions, native of Northern India, where it is said to occur up to 6000ft. elevation ; it is also found in Southern China, Natal, and Caffraria. Its entire fronds, 1ft. to 2ft. long, 1in. to 2in. broad, and borne on stalks 1in. to 3in. long, are produced from a climbing or trailing rhizome of a woody nature ; they are gradually narrowed to both ends, of a somewhat leathery texture, and naked on both sides. The large and prominent (not immersed) sori (spore masses) are disposed in a row not far from the midrib.—*Hooker, Species Filicum*, v., p. 70.

P. (Niphobolus) nummulariæfolium—Niph-ob′-ol-us ; num-mul-a′-rĭ-æ-fol′-ĭ-um (Nummularia-leaved), *Mettenius.*

Though of small dimensions, this little, greenhouse species, native of Northern India, the Philippines, and Malaysia, is very interesting. Its fronds, produced from a slender, thread-like, wide-creeping rhizome, are of two different kinds : the barren ones are elliptical or roundish ; the fertile ones, longer and narrower, are about 2in. long and ½in. broad. Both kinds are of a leathery texture, naked on their upper surface, and densely coated underneath with

a brownish, woolly material. The spore masses sometimes cover their entire surface.—*Hooker*, *Species Filicum*, v., p. 54. *Beddome*, *Ferns of British India*, t. 370.

P. obliquatum—ob-li-qua′-tum (oblique), *Blume*.

A small-growing, stove species, native of Southern India, Ceylon, Malaysia, and the Philippines. Its fronds, 8in. to 12in. long and 1½in. to 2in. broad, are borne on very short stalks, and cut down to the rachis into narrow leaflets dilated at the base; they are of a somewhat leathery texture, and naked on both sides. The spore masses, sunk in a cavity, are disposed four to six on each side of the midrib, and the edges of the fertile leaflets are sometimes undulated.—*Hooker*, *Species Filicum*, iv., p. 190. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Beddome*, *Ferns of Southern India*, t. 167.

P. (Phegopteris) obtusilobum—Phe-gop′-ter-is; ob-tu-sil′-ob-um (blunt-lobed), *Desvaux*.

The fronds of this stove species, of medium dimensions, native of Mauritius, Madagascar, the Cameroon Mountains, and Fernando Po, are borne on densely-tufted stalks about 1ft. long, of a slender nature, and nearly naked; they are 2ft. or more in length, 8in. to 10in. broad, and furnished with leaflets 4in. to 6in. long, gradually narrowed from the base to the point, and cut down nearly to the midrib into entire, slightly sickle-shaped, blunt lobes about ⅛in. broad. The texture is soft and papery, and the small and abundant spore masses are disposed in one row on each side of the midvein.—*Hooker*, *Synopsis Filicum*, p. 305.

P. (Phegopteris) Oldhami—Phe-gop′-ter-is; Old-ham′-i (Oldham's), *Baker*.

A stove species, native of Formosa. Its deltoid fronds (in shape of the Greek delta, Δ) are borne on stalks 1ft. to 1½ft. long and densely scaly at the base; they are 1½ft. to 2ft. long, 1ft. broad, with their lowest leaflets much the largest. The leafits of the lower sides, 2in. to 3in. long, are again divided into distinct, spear-shaped, deeply-cleft segments of a soft, papery texture, and rather glossy on their under-side. The numerous and very dense spore masses are disposed close to the midrib.—*Hooker*, *Synopsis Filicum*, p. 311.

P. (Goniopteris) oligophlebium—Go-nĭ-op′-ter-is ; ol-ig-oph-leb′-ĭ-um (having few veins), *Baker*.

A stove species, of medium dimensions and of little decorative value, native of the Andes of East Peru.—*Hooker*, *Synopsis Filicum*, p. 506.

P. (Goniopteris) oppositifolium—Go-nĭ-op′-ter-is ; op-pos-it-if-ol′-ĭ-um (having opposite leaves), *Hooker*.

This stove species, native of the Island of St. Thomas, West Africa, is of very large dimensions. Its fronds, 3ft. to 5ft. long and 1ft. to 1½ft. broad, are borne on upright stalks 2ft. to 2½ft. long, and furnished with leaflets 6in. to 9in. long, 1in. broad, gradually narrowed from the base to the sharp-pointed extremity, and with the edge cut into somewhat sharp, sickle-shaped lobes. These leaflets are regularly opposite and of a somewhat leathery texture, and the small and abundant spore masses are disposed in a row on each side of the midvein.—*Hooker*, *Species Filicum*, v., p. 8.

P. organense—or-gan-en′-sĕ (from the Organ Mountains), *Mettenius*.

A dwarf-growing, greenhouse species, native of the Organ Mountains, in Brazil, with fronds 6in. to 8in. long and barely ¼in. broad, cut down about half-way to the rachis into close, oblong, blunt lobes of a somewhat leathery texture, naked on both sides, and with the lower part very gradually narrowed. The abundant oblong spore masses are placed one at the base of each lobe, ultimately becoming confluent and forming two long rows close to the midrib. —*Hooker*, *Species Filicum*, iv., p. 177 ; *Icones Plantarum*, t. 509.

P. ornatum—or-na′-tum (adorned), *Wallich*.

This very handsome, robust-growing, stove species, which in Hooker's "Synopsis Filicum" is given as synonymous with *Nephrodium setigerum*, is considered by Beddome to be of specific rank, being distinguishable from that species by its upright rootstock and the constant absence of an involucre. The latter authority also states that *P. ornatum* is abundant in Carcoor Ghât, and is one of the handsomest Ferns in the Madras Presidency.—*Beddome*, *Ferns of Southern India*, t. 171.

P. Otites—O-ti′-tēs (Otites). This is synonymous with *P. tenuifolium*.

P. (Phymatodes) ovatum—Phy-mat-o′-dēs ; o-va′-tum (egg-shaped), *Wallich.*

A greenhouse species, native of Khasya, Sikkim, and Bhotan, where it is said to occur up to 7000ft. elevation. It is provided with a wide-creeping rhizome of a woody nature, from which the fronds, borne on firm, upright stalks 4in. to 8in. long, are produced. These are 6in. to 12in. long, 2in. to 3in. broad, sharp-pointed, but rather suddenly narrowed at the base ; they are of a firm, papery texture, and naked on both sides. The large and conspicuous spore masses are disposed irregularly in one, two, or three series.—*Hooker, Species Filicum*, v., p. 64. *Hooker and Greville, Icones Filicum*, p. 41.

P. owariense—ow-a′-rĭ-en′-sĕ (Owarian). A variety of *P. lycopodioides.*

P. oxylobum — ox-yl′-ob-um (sharply-lobed). This is a synonym of *P. trifidum.*

P. (Phegopteris) paleaceum—Phe-gop′-ter-is ; pal-ĕ-a′-cĕ-um (chaffy), *Powell.*

This robust-growing, stove species, native of Samoa, has the general habit of the better-known *Nephrodium amplum.* Its triangular fronds, four times divided nearly to the rachis and 1½ft. to 2ft. each way, are borne on grey stalks 1ft. to 3ft. long, which, like the rachis, are clothed with narrow scales, the scales becoming larger and more spreading near the base. The lower leaflets, which are much the largest, are long-stalked, unequal-sided, and divided into short-stalked leafits 1in. to 1½in. broad, wedge-shaped on the lower side at the base, their final lobes being spear-shaped, ascending, and bluntish. The whole frond is of moderately firm texture and smooth on both surfaces, with the ribs below slightly scaly. The copious but small sori (spore masses) are disposed in one row on each side of the midvein.—*Hooker, Synopsis Filicum*, p. 505.

P. (Phymatodes) palmatum—Phy-mat-o′-dēs ; pal-ma′-tum (palmately-lobed), *Blume.*

A stove species, from Malaysia and the Philippines, provided with a stout rhizome clothed with large, spear-shaped, dark brown scales. The fronds, distinctly pinnate, and borne on firm, upright, glossy stalks 6in. to 12in. long, are 6in. to 18in. long and 8in. to 12in. broad ; they are formed of a narrow-

oblong, entire terminal leaflet and from one to six pairs of lateral ones. These leaflets are 4in. to 6in. long, ½in. to 1½in. broad, slightly attached at the base to the midrib, of a somewhat leathery texture, and naked on both sides. The sori (spore masses) are disposed in a single row, midway between the edge and the midrib. *P. angustatum* of Blume is a form of this species. —*Hooker*, *Species Filicum*, v., p. 89. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Beddome*, *Ferns of British India*, t. 156.

P. p. Lindleyanum—Lind-ley-a′-num (Lindley's), *Wallich.*

A variety with only a few leaflets, which do not reach down to the rachis.

P. palustre—pal-us′-trĕ (marsh-loving), *Raddi.*

This stove species, native of Brazil and the Philippines, was, according to Lowe, introduced into the Royal Gardens, Kew, in 1837. Its distinctly-pinnate fronds are from 3ft. to 5ft. long, and are furnished with leaflets 6in. to 10in. long, of a leathery texture, light green in colour, and naked on both sides. The abundant sori (spore masses) form a conspicuous feature, being disposed in transverse rows between the veins.—*Lowe*, *Ferns British and Exotic*, ii., t. 45.

P. papillosum—pap-il-lo′-sum (nippled), *Blume.*

A distinct, stove species, of medium dimensions, native of Java and the Philippines. Its fronds, 1ft. or more in length and 2in. broad, are produced from a stout, wide-creeping rhizome of a scaly nature, and borne on erect, slender, rigid stalks 4in. to 6in. long and naked. They are cut down to the rachis into close, horizontal, blunt, entire leaflets of a soft papery texture and naked on both sides. The spore masses, disposed in rows near the edge, are deeply immersed, the cavity being very prominent on the upper side.—*Hooker*, *Species Filicum*, iv., p. 198; *Second Century of Ferns*, t. 46. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. Paradiseæ—Par-ad-i′-sĕ-æ (Paradise), *Langsdorff and Fisher.*

This is a charming, stove species, of somewhat large dimensions, although of very slender habit, native of Brazil and St. Catharine Island. Its deeply-pinnatifid fronds, 1ft. to 4ft. long and 3in. to 8in. broad, are produced from

a creeping rhizome and nearly stalkless. The leaflets, 1½in. to 4in. long, and attached at their base to the rachis, which is clothed with brown hairs, are of a dark green colour, and are rendered very attractive by the sori (spore masses), which are of a bright yellow colour and disposed in one row nearer the edge than the midrib.—*Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Lowe*, *Ferns British and Exotic*, ii., t. 1.

P. parasiticum—par-as-i′-tic-um (parasitic), *Mettenius.*

A small-growing, stove species, which, according to Beddome, is found growing plentifully on trees in the Anamallay Mountains up to 5000ft. elevation, also on the Neilgherries, Neddiwattan, and on rocks and trees down the Sisparah Ghât. Its almost stalkless, entire fronds, seldom more than 3in. long, are of a leathery texture, and have both surfaces, when young, thickly clothed with long, soft hairs. The spore masses are disposed in two rows and eventually become confluent.—*Hooker*, *Species Filicum*, iv., p. 167. *Beddome*, *Ferns of Southern India*, t. 165.

P. Parishii—Par-ish′-ĭ-i (Parish's), *Beddome.*

A small, stove species, native of Moulmein ; it is of little decorative value.—*Beddome*, *Ferns of British India*, t. 125.

P. parvulum—par′-vul-um (little), *Bory.*

This small-growing, stove species, native of Bourbon, Mauritius, Zambesi Land, and Northern India, where it is said to occur up to 8500ft. elevation, is distinct through the stout, short-creeping, scaly rhizome from which its pinnate fronds, 4in. to 6in. long and ½in. broad, are produced. These fronds gradually taper into a very short stalk, and are cut down to the rachis into entire, narrow leaflets of a somewhat leathery texture, naked on both sides, and each bearing two to four spore masses.—*Hooker*, *Species Filicum*, iv., p. 184, t. 274B.

P. (Goniophlebium) patens—Go-nĭ-oph-leb′-ĭ-um ; pat′-ens (spreading), *J. Smith.*

This stove species, of medium dimensions and of little decorative value, is a native of Panama.—*Hooker*, *Species Filicum*, v., p. 23.

P. Pearcei—Pear′-ce-i (Pearce's), *Baker.*

A stove species, native of the Andes of Peru, where it is said to occur at 6000ft. to 7000ft. elevation. Its almost stalkless, spear-shaped, pendulous fronds, 9in. to 15in. long and 1in. to 1¼in. broad, are cut down to a narrow wing into spear-shaped, blunt lobes seldom more than ⅛in. broad at the middle, of a somewhat leathery texture, and dull green in colour, the lower ones being gradually reduced. The sori (spore masses) are disposed close to the edge of the lobes.—*Hooker*, *Synopsis Filicum*, p. 508.

P. pectinatum—pec-tin-a′-tum (comb-like), *Linnæus.*

This Fern, one of the prettiest stove species in cultivation, is also known as *P. Wageneri.* According to Lowe, it was introduced into this country in 1793, and is a native of the West Indies, Mexico, and Brazil, where it is common. Eaton states, in his exhaustive work, "Ferns of North America," that it is also found in Southern Florida, near Enterprise, and at Manatee, in which locality Dr. Garber says that "It is restricted to a small area of high banks of a stream in a hummock draining a series of ponds. According to the same authority, the soil is mostly clay intermixed with a small percentage of sand and vegetable matter." As illustrating the great variations to which this elegant Fern is subject, Dr. Garber adds: "On the side of high banks, and near the water's edge, apparently in pure clay and rocks, the fronds are narrower, more rigid, and erect; while upon the banks and at a little distance from the water, they are wider, flaccid, and generally reclining." The usual dimensions of the fronds, which are produced from a stout, scaly, underground rhizome, are 1ft. to 2ft. in length and 2in. to 6in. in breadth; they are cut to the rachis into numerous closely-set, horizontal, entire leaflets, 1in. to 3in. long, of a soft, papery texture, and of a deep, dark green colour. The rich yellowish-brown sori (spore masses) are disposed in long rows, midway between the midrib and the edge (as shown on one side of Fig. 52).—*Hooker*, *Species Filicum*, iv., p. 203; *Garden Ferns*, t. 10. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Lowe*, *Ferns British and Exotic*, ii., t. 21.



Fig. 52. Portion of Frond of Polypodium pectinatum (nat. size).

P. pellucidum—pel-lu′-cid-um (pellucid-veined), *Kaulfuss.*

This stove species, native of the Sandwich Islands, much resembles *P. vulgare* (the common Polypody) in habit and size, but the veins of its pinnate fronds are beautifully pellucid, being distinct even in dried specimens. The spore masses are large and prominent.—*Hooker*, *Species Filicum*, iv., p. 206; *Second Century of Ferns*, t. 44. *Nicholson*, *Dictionary of Gardening*, iii., p. 191.

P. p. myriocarpum—my-rĭ-oc-ar′-pum (many-fruited), *Hooker.*

This variety differs from the typical plant through its leaflets being pinnatifid (cut nearly to the midrib).—*Hooker*, *Icones Plantarum*, t. 84.

P. (Niphobolus) penangianum—Niph-ob′-ol-us; pen-ang-ĭ-a′-num (from Penang), *Hooker.*

A distinct and very handsome, stove species, native of Penang, with the general aspect of the Bird's-nest Fern (*Asplenium Nidus*). Its entire fronds, 1ft. to 1½ft. long and 2in. to 3in. broad, are almost stalkless; they are very gradually narrowed towards the base and somewhat undulated at the edges; their texture is papery, their upper surface is naked, but their under-side is thickly clothed with fine, silky hairs. The spore masses are disposed in rows close together, confined to the upper part of the frond, and fall distinctly short of the edge. Fig. 53 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 52. *Beddome*, *Ferns of British India*, t. 121.



Fig. 53. Polypodium penangianum (much reduced).

P. pendulum—pen′-dul-um (hanging), *Swartz.*

In this stove species, native of Brazil and Peru, the flaccid, pendulous fronds, 6in. to 12in. long and 1in. to 2in. broad, are produced from a somewhat upright rootstock. They are either stalkless or very short-stalked, and are cut down to the rachis into blunt, entire leaflets, enlarged at the base, of

a somewhat leathery texture, and naked on both sides. The sori (spore masses) are disposed in a row on each side of the leaflets, close to the midrib, and are slightly immersed.—*Hooker*, *Species Filicum*, iv., p. 194.

P. (Goniopteris) pennigerum—Go-nĭ-op′-ter-is ; pen-nig′-er-um (feather-bearing), *Forster*.

This greenhouse species, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1835, is a native of New Zealand. Its fronds, 1½ft. to 2ft. long and 8in. to 12in. broad, are borne on tufted, slightly scaly stalks 6in. to 12in. long. The leaflets are of a firm though papery texture and naked on both sides, the lower ones being gradually reduced ; they are cut about half-way down into blunt lobes, rounded at the base and slightly notched. The spore masses are disposed in rows near the midrib.—*Hooker*, *Species Filicum*, v., p. 7. *Nicholson*, *Dictionary of Gardening*, iii., p. 191. *Lowe*, *Ferns British and Exotic*, ii., t. 15.

P. pentagonum—pent-ag-o′-num (five-angled). A synonym of *P. bisulcatum*.

P. (Phymatodes) percussum—Phy-mat-o′-dēs ; per-cus′-sum (beaten, stamped), *Cavanilles*.

A stove species, of medium dimensions, native of Peru and Brazil. From a wide-creeping rhizome, densely clothed with spear-shaped scales, are produced its entire fronds, 6in. to 12in. long, 1in. to 1½in. broad, gradually narrowed towards both ends, and borne on firm, upright stalks 2in. to 3in. long. The texture is very leathery, and the under-side is densely matted with fine scales. This peculiar Fern, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1842, is rendered very interesting by the large, bold character of its round sori (spore masses), which form a row midway between the midrib and the edge, and are distinctly immersed.—*Hooker*, *Species Filicum*, v., p. 56 ; *Filices Exoticæ*, t. 59. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, ii., t. 20.

P. (Goniophlebium) persicæfolium—Go-nĭ-oph-leb′-ĭ-um ; per-sic-æ-fol′-ĭ-um (Peach-leaved), *Desvaux*.

This handsome, strong-growing, stove species, native of Java, is the *P. cuspidatum* of Blume. It closely resembles the better-known *P. subauriculatum*, from which it is readily distinguished by the leaflets being

narrowed at the base and the lower ones distinctly stalked. The abundant and prominent spore masses are distinctly immersed.—*Hooker*, *Species Filicum*, v., p. 32. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, ii., t. 25.

P. p. grandidens—gran′-did-ens (large-toothed), *Kunze.*

This variety only differs from the typical plant in being furnished with more deeply-toothed leaflets.

P. (Niphobolus) pertusum — Niph-ob′-ol-us ; per-tu′-sum (bored), *Sprengel.*

This pretty, dwarf-growing species, which succeeds equally well under either greenhouse or stove treatment, is a native of Japan, China, the East Indies, and Java, and is said by Lowe to have been introduced into the Royal Gardens, Kew, in 1823. Its entire (undivided) fronds, of a very leathery texture, dark green, and shining on the upper surface, are stalkless and of two distinct forms : the barren ones are spathulate (spoon-shaped) and seldom exceed 4in. in length ; the fertile ones, narrow and of the same breadth throughout, are from 6in. to 8in. long. Both kinds are produced from a short-creeping rhizome of a scaly nature, and their under-side has the appearance of being covered with snow-crystals. The reddish sori (spore masses) are confined to the upper part of the frond, where they are disposed in three rows on each side of the green midrib and eventually become confluent.—*Lowe*, *Ferns British and Exotic*, i., t. 21.

P. peruvianum—per-u-vĭ-a′-num (Peruvian), *Desvaux.*

A stove species, of small dimensions and of botanical interest only, native of Peru and Venezuela.—*Hooker*, *Species Filicum*, iv., p. 186.

P. (Grammitis) Pervillei—Gram-mi′-tis ; Per-vil′-lĕ-i (Perville's), *Mettenius.*

This small-growing, stove species, of little decorative value, seldom attaining more than 2in. in length, is a native of the Seychelles.—*Hooker*, *Synopsis Filicum*, p. 321.

P. Phegopteris—Phe-gop′-ter-is (Phegopteris), *Linnæus.*

This handsome and interesting, hardy Fern, botanically known also as *Phegopteris polypodioides* of Fée, is the common "Beech Fern," a species with

a range of habitat extending from Iceland and Lapland to Japan, Etruria, and Greece, and from Greenland southward to the United States of America, where, according to Eaton, it is found in damp woods and on hillsides, being commonest in the mountainous parts of New England and the Middle States. Eaton, in his exhaustive work, "Ferns of North America" (vol. ii., p. 218), states that its range in America extends to Newfoundland, Labrador, and Greenland in the east, and to the Saskatchewan, Sitka, Alaska, and Unalaska in the north-west, but that it is not known in the United States west of the one hundredth meridian. Correvon also states ("Fougères rustiques," p. 147) that it is found in all parts of Europe; but nowhere is it so abundant as in the United Kingdom.

We find the first record of *P. Phegopteris* as a British plant in Morrison and Bobart's "Historia Plantarum Oxoniensis," published in 1680, and it is stated by Bobart that it had been found in the Northern parts of England. It is also described by Dillenius, in the third edition of Ray's "Synopsis Stirpum Britannicarum," published in 1724, where it is given as "the smaller British Fern with paler stems and lower wings looking downwards." It is found in Wales, near Llanberis; at Capel Curig, North Wales, and in Carnarvonshire; also close to the Powerscourt Waterfall, and at the Waterfall above Lough Eske, County Donegal, in Ireland. In Scotland it occurs on Ben Lomond, at Rubislaw, and at Jedburgh; at Campsie, near Glasgow; on the Grampians, in Aberdeenshire; on Red Caird Hill, in Inverness-shire; in Forfarshire, Sutherland, and other parts of the Highlands. But it is in England that the habitats of this beautiful Fern are most numerous and most varied. Thus we have had it gathered at Lidford Fall and Beckey Fall, Dartmoor, Devonshire, as well as on rocks above Langley Ford, at the base of the Cheviot Hills; at Prestwich Clough and Boghart Clough, in Lancashire; at Egerton Moss, near Bolton; at Settle, in Yorkshire; near Keswick, in Cumberland; and at Cawsey Dean, Durham.

It is difficult to understand why this Fern should bear a popular appellation so singularly inapplicable, for the name has no reference to either its shape or its haunts, as it is more rarely found in woods than on mountain-sides, where, according to Eaton, in America as well as in Europe, the root-stock creeps just beneath the surface of the ground, or in the crevices of mossy rocks, and throws up fronds about 1in. apart. These fronds are 6in.

to 9in. long, 4in. to 6in. broad, and sub-deltoid (somewhat in shape of the Greek delta, Δ); they are borne on slender, naked stalks 6in. to 9in. long, and are cut down nearly to the rachis into close, blunt, entire or slightly-toothed lobes. The lowest or basal pair of lobes of each frond are suddenly deflexed (thrown back). The texture is soft and papery, and the under-side of all the leafy portion is slightly hairy. The sori (spore masses) are disposed nearer the edge than the midrib.—*Hooker*, *Species Filicum*, iv., p. 245; *British Ferns*, t. 3. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Our Native Ferns*, i., t. 1. *Eaton*, *Ferns of North America*, i., t. 29. *Correvon*, *Les Fougères rustiques*, p. 147.



Fig. 54. Portion of Frond of Polypodium Phegopteris multifidum (nat. size).

Like the Oak Fern (*P. Dryopteris*), the species under notice may with advantage be planted out in the open Fernery or grown in pots, and the compost recommended for that pretty species is equally suitable for the Beech Fern, but a greater depth—about 6in.—must be allowed, as it roots much deeper into the ground. Care must also be taken not to bury the rhizomes deeply, but to keep them barely below the surface of the ground.

A moist, shady place is indispensable, as the plant is particularly partial to an abundant and constant supply of water, and to frequent syringings during the growing season. When cultivated in pots in a cool house, the Beech Fern is nearly evergreen, as its old fronds, though discoloured and generally broken at the base, remain on the plants almost until the new ones make their appearance.

P. P. multifidum—mul-tif′-id-um (much-cleft), *Lowe.*

So far as we are aware, this is the only constant variety which the species has produced. It is very similar to the typical plant, but is essentially distinct through its being irregularly multifid (Fig. 54). It was discovered near Stockghyll Force, Ambleside, by Mr. E. J. Lowe, who states that it grew there in great profusion.—*Lowe, Our Native Ferns*, i., p. 9; *New and Rare Ferns*, p. 83.

P. (Drynaria) philippinensis—Dryn-a′-rĭ-a; phil-ip-pi-nen′-sis (native of the Philippines). A synonym of *P. Meyenianum.*

P. Phyllitidis—Phyl-li-ti′-dis (Phyllitidis), *Linnæus.*

This stove species, of peculiar appearance, is a native of Florida and Southern Brazil, where it is very common, and, according to Lowe, it was introduced into British cultivation in the year 1793. In general outward appearance it so much resembles *Scolopendrium vulgare* that, to the uninitiated, it may well appear to be the upright-growing Hart's-tongue of the Tropics. Its entire, stalkless fronds, 1ft. to 3ft. long, 3in. to 4in. broad, and somewhat waved at the edges, are produced from a stout, short-creeping rhizome clothed with brownish, heart-shaped scales; they are sharp-pointed at their extremity and very gradually narrowed to their base; their texture is very leathery, their colour is pale green, and they are naked on both sides, though frequently showing small dots of a chalky appearance on their upper surface. The sori (spore masses) are disposed in regular rows, one on each

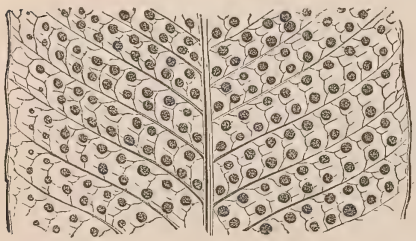


Fig. 55. Portion of Frond of Polypodium Phyllitidis (nearly nat. size).



Pelæa atropurpurea

(½ nat. size)

side of the main veins, extending from the midrib to the edge (Fig. 55).—*Hooker*, *Species Filicum*, v., p. 38. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, i., t. 26A.

P. Phymatodes—Phy-mat-o′-dēs (warted), *Linnæus.*

This distinct, stove species, of large dimensions, also known in gardens under the name of *Drynaria vulgaris*, has a very wide range of habitat. We find it reported as a native of Polynesia and Malaysia, also of Formosa, Loo Choo, Tsus-Sima, Ceylon, the Mascarene Islands, Natal, Zambesi Land, Angola, and the Guinea Coast. According to Lowe, it was introduced into this country between 1816 and 1823. The fronds are produced from a wide-creeping rhizome of a woody nature, and borne on firm, upright, glossy stalks 3in. to 12in. long; they are deeply pinnatifid, varying from 2ft. to 3ft. in length and 1ft. in breadth, and are cut down to a broadly-winged rachis into numerous entire, oblong-spear-shaped lobes 4in. to 8in. long, 1in. to 1½in. broad, of a leathery texture, pale green in colour, shining and naked on both sides. The large, circular spore masses are more or less immersed, and are disposed in two rows on each side of the midvein.—*Hooker*, *Species Filicum*, v., p. 82. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, i., t. 25.

P. P. longipes—long′-ip-ēs (long-stalked), *Kunze.*

This variety, native of the East Indies, and introduced into this country about 1823, differs from the typical plant by its much longer stalks and by the more upright habit of its fronds, which are of an intense green colour and of a glossy nature. The spore masses are usually disposed in one row only on each side of the midvein; they are oblong, of a large size, and distinctly immersed in the frond, causing protuberances on their upper surface.—*Lowe*, *Ferns British and Exotic*, i., t. 24.

P. P. macrourum—mac-rou′-rum (long-tailed), *Baker.*

This variety, native of Queensland, whence it was introduced into this country in 1886, much resembles the species in habit and size; it is, however, readily distinguished by its long-tailed fronds, 2ft. to 3ft. long, 6in. to 12in. broad, and of a bright green colour, the spear-shaped tail having its middle part deeply cleft.—*Nicholson*, *Dictionary of Gardening*, iv., p. 592.

P. Picoti—Pi-cot′-i (Picot's), *Regel.*

This is a noble-looking, greenhouse Fern, of vigorous habit. Its numerous arching, wavy, narrow-oblong, entire fronds, 3ft. or more in length and 4in. to 6in. broad, are of a leathery texture, dark green and very shiny above, and glaucous-green beneath. It is a native of Brazil, and was introduced into Europe in 1886.—*Nicholson, Dictionary of Gardening*, iv., p. 592.

P. (Goniophlebium) piloselloides — Go-nĭ-oph-leb′-ĭ-um ; pil-o-sel-lŏ-ī′-des (Pilosella-like), *Linnæus.*

Among the various Polypods of diminutive size, this stove species (Fig. 56), which is common throughout Tropical America and the West Indies, is undoubtedly one of the most attractive. It is the *Lopholepis piloselloides* of J. Smith, and has the appearance of a miniature Niphobolus, its barren and fertile fronds, articulated upon a slender, very wide-creeping rhizome of a wiry nature, differing from each other in both size and form. The barren ones, 1in. to 3in. long, ½in. to ¾in. broad, and egg-shaped, are borne on short, hairy stalks ; the fertile ones, narrower and longer, are borne upon longer, more slender, and equally hairy stalks. Both kinds are of a leathery texture, pale green in colour, and more or less scaly on both sides. The large, bright yellow sori (spore masses) form a conspicuous row on each side of the midrib.—*Hooker, Garden Ferns*, t. 18. *Nicholson, Dictionary of Gardening*, iii., p. 192. *Lowe, Ferns British and Exotic*, i., t. 32.



Fig. 56. Portion of Creeping Rhizome (with Barren Fronds) of Polypodium piloselloides (nearly nat. size).

P. p. aurisetum—au-ri-se′-tum (having golden bristles), *Raddi.*

This variety differs from the typical species in the shape of its barren fronds, which are sometimes nearly round and scaly, and in its fertile ones having their under-surface densely covered with soft hairs of a reddish colour.—*Hooker, Synopsis Filicum*, p. 340.

P. p. ciliatum—cil-ĭ-a′-tum (fringed), *Willdenow.*

The distinguishing feature of this variety resides in the peculiar character of the fertile fronds, which are so narrow that the spore masses project beyond their margins.—*Hooker*, *Synopsis Filicum*, p. 340. *Nicholson*, *Dictionary of Gardening*, iii., p. 192.

P. platybasis—plat-yb-a′-sis (having a broad base), *Baker.*

In this stove species, of small dimensions and of little decorative value, native of Salta, in the Andes of Peru, the bipinnate (twice-divided) fronds, produced from a rhizome as thick as a quill, have their leaflets deeply notched, of a leathery texture, and dark dull green in colour, and their leafits suddenly enlarged at the base. The spore masses occupy the whole space between the midrib and the edge.—*Hooker*, *Synopsis Filicum*, p. 511.

P. (Goniophlebium) platylepis—Go-nĭ-oph-leb′-ĭ-um ; plat-yl′-ep-is (broad-scaled), *Mettenius.*

A small-growing, stove species, of purely botanical interest, having a rhizome clothed with conspicuously large, spear-shaped scales of a pale brown colour. It is a native of Guatemala and New Granada.—*Hooker*, *Synopsis Filicum*, p. 512.

P. (Phegopteris) platylobum—Phe-gop′-ter-is ; plat-yl′-ob-um (broad-lobed), *Baker.*

This strong-growing species, native of Tarapota, North-East Peru, produces fronds 2ft. to 3ft. long, 1ft. or more in breadth, born on firm, upright stalks 1ft. to 1½ft. long, and scaly towards the base. The central leaflets, 6in. to 8in. long and 1in. to 1¼in. broad, are cut down to the rachis in the lower part into blunt, oblong lobes, and their lower leaflets are slightly reduced. The fronds are of a soft, papery texture, and almost naked on their underside ; the spore masses are situated almost on their margins.—*Hooker*, *Species Filicum*, iv., p. 238.

P. (Phymatodes) platyphyllum — Phy-mat-o′-dēs ; plat-yph-yl′-lum (broad-leaved), *Swartz.*

This is a very striking and distinct, stove species, of medium dimensions, native of Java. Its entire (undivided) fronds, 1ft. to 1½ft. long and 2in. to

4in. broad, are borne on strong, erect stalks 3in. to 4in. long, and are produced from a short-creeping, woody rhizome densely clothed with long, nearly black scales. They are sharp-pointed, of a very thick texture, of a rigid nature, dark shining green on their upper surface, and naked on both sides. The main veins are very distinct, and the spore masses, disposed in single rows between each of them, are conspicuously immersed. *P. crassinervium* is identical with this species.—*Hooker*, *Species Filicum*, v., p. 63. *Nicholson*, *Dictionary of Gardening*, iii., p. 192.

P. plebeium—pleb-ei′-um (plebeian, common), *Schlechtendahl.*

In general appearance, this stove species, native of Mexico and Peru, closely resembles *P. vulgare.* Its habit and dimensions are very similar to those of that popular species, of which it also possesses the stout, wide-creeping rhizome; but it is readily distinguished by the brown scales with which the under-side of its fronds is conspicuously covered, and which form a striking contrast with the peculiar bluish-green colour of the leafy portion.—*Hooker*, *Species Filicum*, iv., p. 213. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *New and Rare Ferns*, t. 33.

P. (Goniophlebium) plectolepis — Go-nĭ-oph-leb′-ĭ-um; plec-tol′-ep-is (having plaited scales), *Hooker.*

A stove species, native of Mexico and Guatemala, with fronds 1ft. to 2ft. long and 1ft. broad, borne on firm, glossy stalks 6in. to 12in. long, produced from a stout rhizome clothed with rough, rusty-brown scales, regularly disposed and folded or plaited together. The numerous leaflets, of a soft, papery texture and finely hairy on both sides, are 4in. to 6in. long, ½in. broad, and gradually narrowed from the base to the point, with the edge distinctly notched. The spore masses are disposed in single rows.—*Hooker*, *Species Filicum*, v., p. 30. *Nicholson*, *Dictionary of Gardening*, iii., p. 192.

P. (Goniophlebium) plesiosorum—Go-nĭ-oph-leb′-ĭ-um; ple-sĭ-os-o′-rum (having close sori), *Kunze.*

This stove species, also called *P. colpodes*, *P. gonatodes*, and *P. rhodopleuron*, is a native of Mexico and Venezuela. It is very closely related to the better-known *P. loriceum*, from which it differs by its shorter and broader

fronds, of a more papery texture, and by its larger spore masses, usually disposed in one row only. The plant known in gardens as *P. appendiculatum* is a form of this species.—*Hooker*, *Species Filicum*, v., p. 21. *Nicholson*, *Dictionary of Gardening*, iii., p. 192.

P. plumula—plu′-mul-a (feathered). This is synonymous with *P. elasticum*.

P. (Dictyopteris) polycarpum—Dic-tŷ-op′-ter-is ; pol-yc-ar′-pum (many-fruited), *Baker*.

A small-growing, stove species, of little decorative value, with broadly triangular fronds of a parchment-like texture, having the spore masses copiously scattered over their under-side. It is a native of Malacca.—*Hooker*, *Synopsis Filicum*, p. 506.

P. (Phegopteris) polypodioides—Phe-gop′-ter-is ; pol-yp-od′-ĭ-ŏ-ĭ′-des (Polypodium-like). For the plant known as *Phegopteris polypodioides*, see *P. Phegopteris*.

P. (Niphobolus) porosum — Niph-ob′-ol-us ; por-o′-sum (porous). Synonymous with *P. fissum*.

P. (Phymatodes) Powellii — Phy-mat-o′-dēs ; Pow-el′-lĭ-i (Powell's), *Baker*.

A stove species, of large dimensions, native of Samoa, and very closely related to the better-known *P. nigrescens*, from which it is readily distinguished by its narrow and more numerous lobes and by its spore masses not being immersed.—*Hooker*, *Synopsis Filicum*, p. 364.

P. (Goniopteris) proliferum—Go-nĭ-op′-ter-is ; pro-lif′-er-um (proliferous), *Presl*.

This stove species, of medium dimensions, which, according to Lowe, was introduced into this country in 1820, has a very wide range of habitat. Beddome states that it is very common on the hills near Kamptee and Jubbulpore, in the Neilgherries, while it is given by Hooker as a native of Northern India, Southern China, the Philippines, New Caledonia, Northern Australia, Angola, Mauritius, Zambesi Land, and South Africa. It is a free-growing Fern, of somewhat straggling habit, producing from a stout,

creeping rhizome its slender, pinnate fronds, 1ft. to 2ft. long, 6in. to 12in. broad, often elongated and rooting at the point, and copiously bearing young plants in the axils of the leaflets. The leaflets, of a dull green colour, of a somewhat leathery texture, and slightly hairy on both sides, are 4in. to 6in. long, ½in. to ¾in. broad at the base, with their edge bluntly lobed and their extremity often blunt. The abundant oval spore masses are sometimes confluent.—*Hooker*, *Species Filicum*, v., p. 13. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, ii., t. 18. *Beddome*, *Ferns of Southern India*, t. 172.

P. (Drynaria) propinquum — Dryn-a′-rĭ-a ; prop-in′-qŭ-um (allied), *Wallich.*

A stove species, of medium dimensions, native of Nepaul, Sikkim, Simla, Khasya, and Assam, where, according to Beddome, it occurs at elevations varying between 5000ft. and 7000ft. ; it is also found in Java and in the West African Islands. Its barren and fertile fronds, produced from a wide-creeping rhizome of a woody nature, are of totally distinct appearance : the barren ones, 4in. to 9in. long and 3in. to 4in. broad, are cut half-way or more down to the rachis into bluntish lobes, while the fertile ones, 1½ft. to 3ft. long and often 1ft. broad, have their lobes 4in. to 6in. long, reaching down nearly or quite to the rachis ; all are of a somewhat leathery texture and of a dull green colour. The sori (spore masses), disposed in a regular row on each side of and close to the midrib, are placed at the point of union of several veinlets. *P. Willdenovii* of Blume is identical with this species.—*Hooker*, *Species Filicum*, v., p. 97 ; *Garden Ferns*, t. 35. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, ii., t. 57. *Beddome*, *Ferns of British India*, t. 160.

P. pruinatum—prŭ-i-na′-tum (hoary), *Baker.*

A greenhouse species, of very diminutive dimensions, native of Nicaragua. —*Hooker*, *Synopsis Filicum*, p. 508.

P. (Phegopteris) pteroideum—Phe-gop′-ter-is ; pter-ŏ-i′-dĕ-um (wing-like), *Klotzsch.*

This gigantic, stove species, which is said to attain as much as 15ft. in height, is a native of Colombia, Ecuador, and Brazil. Its fronds, 3ft. to 6ft.

or more in length and 2ft. to 3ft. broad, are borne on strong stalks 2ft. to 4ft. long, scaly at the base, but naked upwards. The lower leaflets, 1ft. to 1½ft. long and 3in. to 4in. broad, are again divided into narrow, sharp-pointed leafits ¼in. broad, the lower ones of which are thrown back. The fronds are of a somewhat leathery texture, naked on both sides, and have their spore masses disposed along the margins of their leafits.—*Hooker*, *Species Filicum*, iv., p. 255, t. 280.

P. puberulum—pu-ber′-ul-um (minutely downy), *Schlechtendahl.*

A stove species, of medium dimensions, native of Mexico and Guatemala, with fronds 1ft. to 1½ft. long, 6in. to 8in. broad, borne on firm, polished, naked stalks 6in. to 8in. long, and produced from a wide-creeping, scaly rhizome. The leaflets, 3in. long and ½in. broad, have their edge irregularly notched, and are distinctly eared on both sides at the base; they are of a soft, papery texture and slightly hairy, and the spore masses are disposed in rows nearer the edge than the midrib.—*Hooker*, *Species Filicum*, iv., p. 220.

P. (Goniophlebium) pubescens—pu-bes′-cens (downy), *Hooker and Greville.*

This pretty, small-growing, stove Fern, native of the Andes of Peru, produces from a wide-creeping rhizome of a scaly nature its pinnate fronds, 6in. to 12in. long and 3in. to 4in. broad, which are borne on naked stalks 4in. to 8in. long, and cut down to the rachis into numerous nearly entire leaflets, the lowest pair of which are deflexed and rather reduced. The fronds are of a somewhat leathery texture, slightly glandular and hairy on their under-side, and have their spore masses generally disposed in a single series.—*Hooker*, *Species Filicum*, v., p. 19. *Hooker and Greville*, *Icones Filicum*, t. 182.

P. (Phlebodium) pulvinatum — Phleb-o′-dĭ-um; pul-vi-na′-tum (cushioned). A variety of *P. aureum.*

P. (Phegopteris) punctatum—Phe-gop′-ter-is; punc-ta′-tum (dotted), *Thunberg.*

This strong-growing, greenhouse species, with ample and much-divided foliage, has a wide range of habitat, for it is said to be a native of Colombia,

Chili, the Sandwich Islands, New Zealand, New Caledonia, Australia, Japan, Malaysia, and the Philippine Islands. It is also said to occur from Northern India to Ceylon, Bourbon, St. Helena, &c. From a wide-creeping, hairy rhizome, its much-divided fronds, 1ft. to 4ft. long and 6in. to 2ft. broad, are produced; they are borne on firm, erect, naked or hairy stalks 1ft. to 2ft. long, of a viscid or sticky nature. The lower leaflets, sometimes 2ft. long, are deltoid (in shape of the Greek delta, Δ), cut into close, spear-shaped leafits and segments, with notched or deeply-cleft, oblong ultimate lobes, the edges of which are often more or less reflexed. The fronds are of a soft, papery texture, with their under-side slightly hairy, and the abundant spore masses are disposed near the margin of the lobes. — *Hooker*, *Species Filicum*, iv., p. 272. *Nicholson*, *Dictionary of Gardening*, iii., p. 192.



Fig. 57. Entire Frond of Polypodium pustulatum (nat. size).

P. p. rugulosum — ru-gul-o′-sum (slightly wrinkled), *Labillardière.*

The fronds of this variety are less divided and of a more leathery texture than in the type, and their rachis (stalk of the leafy portion) is of a deep purplish-brown colour and densely viscid. —*Hooker*, *Synopsis Filicum*, p. 312.

P. (Phymatodes) pustulatum—Phy-mat-o′-dēs; pus-tul-ai′-tum (blistered), *Forster.*

A distinct and very useful, greenhouse species, native of Australia and New Zealand, whence it was introduced into the Royal Gardens, Kew, in 1826. Its singular fronds, produced in great abundance from a copiously-branched, wide-creeping rhizome of a woody nature and covered with narrow, dark brown scales, are borne on stalks 1in. to 3in. long. They vary in shape from entire, 3in. to 9in. long, ¼in. to ¾in. broad, and narrowed to both ends (Fig. 57), to 1ft. to 1½ft. long, 3in. to 4in. broad, and cut down to a broadly-winged rachis throughout into

spear-shaped lobes. These fronds are of a papery texture, dark green in colour, with beautifully-marked veins darker still, and smooth on both sides. The conspicuous circular spore masses are disposed in a single series along the margin of the lobes, and distinctly immersed.—*Hooker*, *Species Filicum*, v., p. 80. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, ii., t. 8.

This plant is of easy culture ; it is well adapted for growing in dark places where hardly any other Fern would thrive, and for planting in such positions on stones or rock-work, which it rapidly covers and to which it clings with a remarkable tenacity.

P. pygmæum—pyg-mæ′-um (very dwarf), *Buckingham.*

A very diminutive, stove species, of botanical interest only, native of Bourbon Island.—*Hooker*, *Synopsis Filicum*, p. 507.

P. (Drynaria) quercifolium—Dryn-a′-rĭ-a ; quer-cif-ol′-ĭ-um (Oak-leaved), *Linnæus.*

This is one of the most curious Ferns known in cultivation ; it is a stove species, native of Queensland and India, where, according to Beddome, it is found growing on trees and rocks, being very common on the Western side of the Madras Presidency, from the plains up to 4000ft. elevation. According to Lowe, it was introduced into the Royal Gardens, Kew, by Dr. Wallich in 1840. The plant is provided with a thick rhizome of a woody nature, from which its distinct barren and fertile fronds are produced. The barren ones, stalkless, brown, rigid, 3in. to 12in. long, and 2in. to 6in. broad, are bluntly lobed often half-way down ; the fertile ones, on the contrary, are long-stalked, 2ft. to 3ft. long, 1ft. or more in breadth, and cut down nearly to the rachis into entire lobes 6in. to 9in. long, ½in. to 1½in. broad, of a rigid texture, and naked on both sides. The large and conspicuous spore masses are disposed half-way between the midrib and the edge.—*Hooker*, *Species Filicum*, v., p. 96. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Beddome*, *Ferns of Southern India*, t. 187. *Lowe*, *Ferns British and Exotic*, ii., t. 10.

P. reclinatum—rec-li-na′-tum (drooping), *Brackenridge.*

A stove species, of peculiar appearance, native of Southern Brazil, with pendent, very flaccid fronds 1ft. to 2ft. long, 1in. to 1¼in. broad, and borne

on slender, very short, hairy stalks. The closely-set, egg-shaped, blunt, entire leaflets are of a soft, papery texture, and are clothed on their under-side with soft hairs. The spore masses are disposed two to five in a row.—*Hooker*, *Species Filicum*, iv., p. 222.

P. recurvatum—rec-ur-va′-tum (recurved), *Kaulfuss.*

A stove species, native of Brazil, and closely allied to *P. pectinatum*, from which it differs principally in the nature of its scales and in the shape of its fronds, the lower leaflets of which are not reduced.—*Hooker*, *Synopsis Filicum*, p. 332.

P. (Goniopteris) refractum — Go-nĭ-op′-ter-is ; ref-rac′-tum (broken), *Fischer and Meyer.*

This very handsome, stove species, native of Brazil, and, according to Lowe, introduced into England in 1837, produces from an upright-growing rootstock its pinnate fronds, about 1ft. long, 6in. broad, and furnished with spear-shaped leaflets. These leaflets are eared on both sides at the base, sinuated (dented) on their edges, of a stiff texture, and glossy on both sides, the lower ones being conspicuously deflexed (thrown back). The abundant minute, black spore masses are irregularly scattered over the whole of their under-side.—*Lowe*, *Ferns British and Exotic*, ii., t. 48.

P. (Goniophlebium) Reinwardtii—Go-nĭ-oph-leb′-ĭ-um ; Rein-wardt′-ĭ-i (Reinwardt's). A synonym of *P. subauriculatum.*

P. (Campyloneuron) repens—Camp-yl-on-eur′-on ; re′-pens (creeping), *Linnæus.*

In this stove species, native of Mexico, the West Indies, and Brazil, and which, Lowe states, was introduced into the Royal Gardens, Kew, in 1841, the fronds are produced from a slender but firm, wide-creeping, tortuous rhizome, and borne on firm stalks 1in. to 5in. long. They are entire or slightly undulated, 6in. to 18in. long, 1in. to 3in. broad, sharp-pointed at their extremity, and very gradually narrowed at the base ; their texture is somewhat leathery, their colour bright green, and their upper surface dotted over with white scales. The round and conspicuous spore masses are disposed in

rows extending from the midrib to the edge of the frond.—*Hooker*, *Species Filicum*, v., p. 39. *Nicholson*, *Dictionary of Gardening*, iii., p. 192. *Lowe*, *Ferns British and Exotic*, ii., t. 9B.

P. (Goniopteris) reptans — Go-nĭ-op′-ter-is ; rep′-tans (creeping), *Swartz.*

This pretty and distinct, stove species, native of the West Indies, Guatemala, and Brazil, is very variable. Its fronds, often decumbent and rooting at their extremity, are borne on tufted, slender, wiry, naked stalks 1in. to 8in. long. The leafy portion, 4in. to 12in. long and 1in. to 3in. broad, is divided into leaflets ½in. to 1½in. long, often eared at the base, the lower ones being short-stalked. The texture is soft and papery, and the under-side is naked or slightly hairy. The abundant sori (spore masses) are irregularly scattered over the whole of the under-surface.—*Hooker*, *Species Filicum*, v., p. 6. *Nicholson*, *Dictionary of Gardening*, iii., p. 193. *Lowe*, *Ferns British and Exotic*, i., t. 34B.

P. r. asplenioides—as-ple-nĭ-ŏ-i′-des (Spleenwort-like), *Link.*

A variety of larger dimensions and of more upright habit than the typical species.

P. rhodopleuron — rhod-op-leur′-on (red-veined). This is synonymous with *P. plesiosorum.*

P. rigescens—rig-es′-cens (stiff), *Bory.*

A stove species, of small dimensions, native of Cuba, Chili, and Brazil, also of Bourbon Island and Fernando Po. Its erect fronds, 6in. to 12in. long and ¾in. or more in width, are produced from a stout-creeping rhizome densely clothed with dull brown scales, and borne on wiry, naked or slightly downy stalks 1in. to 3in. long ; they are cut down to the rachis into close, entire, blunt, narrow-oblong leaflets of a stiffish texture, naked on both surfaces, the under-side being sometimes glaucous (bluish-green). The sori (spore masses) are disposed in rows of four or five on each side of the midvein. *P. firmum* of Klotzsch is very closely related to this species.—*Hooker and Greville*, *Icones Filicum*, t. 216.

P. (Drynaria) rigidulum — Dryn-a′-rĭ-a ; rig-id′-ul-um (slightly rigid), *Swartz.*

A stove species, native of Malaysia and Queensland, frequently met with in gardens under the name of *P. diversifolium.* Its fronds, produced from a stout, wide-creeping rhizome, are of two distinct forms : the barren ones are stalkless, 6in. to 9in. long, 3in. to 4in. broad, and cut down about halfway to the rachis into blunt lobes ; the fertile ones, 2ft. to 4ft. long and 1ft. to 1½ft. broad, are long-stalked and distinctly pinnate, with leaflets 1in. or more apart. These leaflets are 6in. to 12in. long, ¼in. to ½in. broad, narrowed or stalked at the base, and more or less deeply notched along the margin. The texture of the fronds is somewhat leathery, they are of a glossy nature and naked on both sides, and the spore masses, disposed in a single row halfway between the edge and the midrib, are immersed.—*Hooker*, *Species Filicum*, v., p. 98 ; *Garden Ferns*, t. 5. *Nicholson*, *Dictionary of Gardening*, iii., p. 193. *Beddome*, *Ferns of British India*, t. 314.



Fig. 58. Polypodium rivale (much reduced).

P. (Phegopteris) rigidum — Phe-gop′-ter-is ; rig′-id-um (rigid), *Hooker and Greville.*

A very variable, stove species, native of Guatemala and Peru, the forms of which differ from those of *Aspidium* (*Polystichum*) *aculeatum* only in the want of an involucre. It is essentially distinct from *P. rigidum* of Lowe, which is a plant with entire (undivided) fronds, of upright habit, very thick texture, and glossy appearance.—*Hooker*, *Synopsis Filicum*, p. 310 ; *Species Filicum*, iv., p. 246. *Lowe*, *Ferns British and Exotic*, ii., t. 37A.

P. (Drynaria) rivale—Dryn-a′-rĭ-a ; ri-va′-lĕ (brook-loving), *Mettenius.*

This distinct, stove species, which is the *Drynaria mollis* of Beddome, is a native of the North-East Himalayas ; it produces from its stout, creeping rhizomes clothed with narrow, transparent scales of a bright rusty-

colour, two very distinct forms of fronds. The barren ones, 4in. to 6in. long and 2in. broad, are cut down three-quarters of the way to the rachis into blunt lobes, while the fertile ones, 1½ft. to 2ft. long, 6in. to 8in. broad, and distinctly stalked, have blunt, entire lobes 2in. to 3in. long, ½in. broad, reaching down nearly or quite to the rachis. Both kinds are of a soft, papery texture, and their spore masses are disposed in a single row on each side of and close to the midrib. Fig. 58 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Synopsis Filicum*, p. 367. *Beddome*, *Ferns of British India*, t. 216.

P. (Phegopteris) Robertianum — Phe-gop′-ter-is ; Ro-ber-tĭ-a′-num (Robert's), *Hoffmann.*

This distinct and pretty, hardy Fern, popularly known as the "Limestone Polypody," "Smith's Polypody," and the "Rigid Three-branched Polypody," was formerly, and is now by some authors, looked upon as a variety of *P. Dryopteris.* Bolton was the first to point out the difference between *P. Robertianum* and *P. Dryopteris*, and Hoffmann to pronounce it a distinct species, which T. Moore and Lindley have retained. It is of very similar appearance, though a much larger and more robust Fern, and its fronds are covered with a down that gives it the appearance of being dusted over with lime. Another specially distinct character resides in the development of its fronds, which never assume the appearance of three little balls like those of *P. Dryopteris*, and, contrary to that popular species, *P. Robertianum* seems to delight in sunshine. It is a native of England, Wales, France, Hungary, Germany, Switzerland, Canada, Norway, and Asia, and is found in a wild state only on limestone soil, though, under cultivation, it thrives in light soil without additional limestone. Its natural presence in any part of Ireland has not until now been recorded, and, although, generally speaking, it is a North-of-England Fern, it has not been discovered in Scotland and has only seldom been found in Wales (principally in Denbighshire). T. Moore, in "Ferns of Great Britain and Ireland," remarks that in the West of England it only descends to 250ft. above the sea, and in the North it ascends to 900ft. Lowe also states that Dr. Hooker found it on the Himalayas at elevations of from 5000ft. to 8000ft. In England it has been gathered about Matlock Bath and on the roadside under the Lover's Leap, at Buxton, in Derbyshire ; near

Settle, in Yorkshire; at Arncliff, Gordale, and White Scars, near Ingleton; at Shedding Clough, near Burnley, and near Lancaster; in Leigh Woods, near Bristol; and on Cheddar Cliffs and Box Quarries, near Bath, in Somersetshire. Although the plant was only first recognised as a native of England by the late Sir E. Smith, formerly President of the Linnean Society, the "Limestone Polypody" was known to such old authors as Clusius Tabernæmontanus, and in Johnson's edition of Gerarde's "Herbal" it is figured and described as *Dryopteris Tragi*. *P. calcareum* is another name for this species.

The fronds of *P. Robertianum* are distinctly bipinnate, with the lowest pair of leaflets occasionally twice cleft again on the posterior side; they are 6in. to 18in. long, somewhat rigid, upright, and produced from a creeping rhizome of a dark brown colour. The small, round sori (spore masses) are scattered over the whole under-surface, where they become partially confluent. —*Hooker*, *British Ferns*, t. 5. *T. Moore*, *Ferns of Great Britain and Ireland*, t. 6. *Lowe*, *Ferns British and Exotic*, i., t. 28. *Correvon*, *Les Fougères rustiques*, p. 149. *Lowe*, *Our Native Ferns*, i., t. 5.



Fig. 59. Polypodium rostratum (¼ nat. size).

P. (Phymatodes) rostratum—Phy-mat-o′-des; ros-tra′-tum (beaked), *Hooker*.

A small-growing, greenhouse species, native of Khasya, Bhotan, and Mishmee, in the Eastern Himalayas. Its entire (undivided) fronds, 2in. to 4in. long, ½in. to 1in. broad, and borne on firm, naked stalks 1in. to 2in. long, are produced from a thread-like, wide-creeping rhizome clothed with narrow scales. They are gradually narrowed to both ends, and have their edge entire; their texture is leathery, and the large sori (spore masses) are disposed in single rows near the midrib. This Fern delights in decomposed vegetable matter, and makes a pretty specimen when grown on a Tree-Fern trunk. Fig. 59 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 66; *Second Century of Ferns*, t. 53. *Beddome*, *Ferns of British India*, t. 159.

P. (Goniopteris) rubrinerve—Go-nĭ-op′-ter-is ; rub-rin-er′-vĕ (having red nerves), *Baker*.

This strong-growing Fern, native of Aneiteum and Fiji, is considered as scarcely more than a variety of *P. urophyllum*.—*Hooker*, *Synopsis Filicum*, p. 315.

P. (Phegopteris) rufescens—Phe-gop′-ter-is ; ru-fes′-cens (reddish), *Blume*.

A stove species, of medium dimensions, native of Java, Ceylon, New Caledonia, and Queensland. Its broadly-triangular fronds, 1ft. to 1½ft. long and 9in. to 12in. broad, are produced from a short-creeping rhizome and borne on firm, erect, naked stalks 1ft. to 1½ft. long. The lower leaflets, much the largest, are deltoid (in shape of the Greek delta, Δ), 6in. to 8in. long, and 3in. to 4in. broad, and their unequal-sided, spear-shaped leafits are bluntly lobed, the lowest nearly down to the rachis. The fronds are of a somewhat leathery texture and naked or slightly downy on both sides, and the spore masses are disposed in one row each side of and close to the midvein.—*Hooker*, *Species Filicum*, iv., p. 257. *Nicholson*, *Dictionary of Gardening*, iii., p. 193. *Beddome*, *Ferns of Southern India*, t. 236.

P. rufulum—ru′-ful-um (reddish). This is synonymous with *P. lepidopteris rufulum*.

P. rugulosum—rug-ul-o′-sum (wrinkled). A synonym of *P. punctatum rugulosum*.

P. (Phymatodes) rupestre—Phy-mat-o′-des ; ru-pes′-trĕ (rock-loving), *Blume*.

A stove species, native of Java and the Philippine Islands, with fronds 4in. to 8in. long and 1in. to 1½in. broad, produced from a woody rhizome and borne on firm, erect stalks 4in. to 8in. long. They are simple (undivided), sharp-pointed at their summit, of a very leathery texture, and naked on both sides. The spore masses are disposed in two rows between the main veins, and not immersed. This must not be confounded with the *P. rupestre* usually met with in gardens under the name of *Niphobolus rupestris*, which is a totally different plant, and is properly known as *P. serpens*.—*Hooker*, *Species Filicum*, v., p. 64. *Nicholson*, *Dictionary of Gardening*, iii., p. 193.

P. (Phymatodes) saccatum—Phy-mat-o′-dēs ; sac-ca′-tum (in a bag), *Lowe.*

This stove species, native of Java, is a distinct and very handsome Fern, with pendulous fronds 2ft. to 2½ft. long, cut down to a winged rachis into spear-shaped, sharp-pointed leaflets 8in. to 10in. long and about 1¼in. broad ; they are of a parchment-like texture, bright green, and shining. The spore masses, disposed in a regular row on each side of the midveins, are deeply immersed and form elevated tubercles on the upper side of the fronds.—*Lowe*, *Ferns British and Exotic*, ii., t. 59.

P. (Phymatodes) salicifolium — Phy-mat-o′-dēs ; sal-ic-if-ol′-ĭ-um (Willow-leaved). This is a variety of *P. lycopodioides.*

P. (Phymatodes) samarense—Phy-mat-o′-dēs ; sam-ar-en′-sē (native of Samar), *Mettenius.*

This stove species, native of the Philippine Islands, has much the appearance of a Niphobolus, through the dense coating of dirty-white down over the under-surface of its leathery fronds, which are 1ft. to 2ft. long, ½in. to ¾in. broad, and quite entire. These fronds are produced from a wide-creeping rhizome of a firm nature, and are borne on firm, erect stalks 1in. to 4in. long. The upper half of the fertile fronds is contracted, and the spore masses occupy the entire surface of the contracted portion.—*Hooker*, *Synopsis Filicum*, p. 356.

P. samoense—sam-ŏ-en′-sĕ (from Samoa), *Baker.*

A small-growing, stove species, with nearly stalkless, entire fronds 3in. to 6in. long, bluntish at their summit, very gradually narrowed in their lower part, of a somewhat leathery texture, and almost naked on both surfaces. The small and numerous spore masses form an irregular, wavy line near the edge, which is nearly entire.—*Hooker*, *Synopsis Filicum*, p. 321.

P. (Phegopteris) sandvicense—Phe-gop′-ter-is ; sand-vic-en′-sĕ (from the Sandwich Islands), *Hooker and Arnott.*

This stove species, of robust habit, native of the Sandwich and Society Islands, has ample and much-divided fronds 3ft. or 4ft. long, 2ft. or more in breadth, borne on stout, naked stalks 2ft. long and of a glossy nature.

The lowest leaflets are 1ft. to 1½ft. long and 6in. to 8in. broad ; their pinnules (leafits), spear-shaped, spreading, 3in. to 4in. long, and 1½in. broad, are again divided into narrow egg-shaped segments bitten off on the lower side, and deeply cleft on the upper one into narrow, toothed lobes. They are naked on both sides, and have their spore masses disposed usually one near the base of each lobe. This must not be confounded with *P. sandvicense* of Hooker, which is synonymous with *P. stegnogrammoides.—Hooker*, *Species Filicum*, iv., p. 267. *Nicholson*, *Dictionary of Gardening*, iii., p. 193.

P. (Phymatodes) sarcopus—Phy-mat-o′-dēs ; sar′-cop-us (having a fleshy foot or stalk), *De Vriese and Teysmann.*

A stove species, native of the Celebes, with oblong, simply-pinnate fronds 1ft. to 1½ft. long, 6in. to 8in. broad, borne on stout, naked stalks 6in. to 9in. long and of a fleshy nature. The strap-shaped, entire leaflets, about ½in. long, are dilated at the base, of a somewhat leathery texture, and naked on both surfaces. The spore masses, disposed in a single row midway between the midrib and the edge of the leaflets, are immersed in a pit with a distinctly-defined border, and form a much-raised, nippled surface on the upper side.—*Hooker*, *Synopsis Filicum*, p. 514.

P. sarmentosum—sar-men-to′-sum (flexible), *Brackenridge.*

A small-growing, stove species, of little decorative value, seldom more than 6in. high and of a somewhat leathery texture. It is a native of the Sandwich Islands.—*Hooker*, *Species Filicum*, iv., p. 195.

P. Schkuhri—Schkuhr′-i (Schkuhr's). This is synonymous with *P. elasticum.*

P. (Phlebodium) Schneiderii — Phleb-o′-dĭ-um ; Schnei-der′-ĭ-i (Schneider's), *Schneider.*

This may be considered the most striking and at the same time the most interesting hybrid artificially raised. It originated among some seedlings of *P. aureum* and *P. vulgare elegantissimum*, the spores of which had been purposely sown together. While in a young state the offspring showed very little difference from *P. aureum*, but its fronds, at first entire and conspicuously undulated, became more and more divided, and on the same plant one could

at one time see fronds entirely similar to *P. aureum*, and others partaking to a great extent of the divided character peculiar to *P. v. elegantissimum*. As



Fig. 60. Polypodium Schneiderii
(⅛ nat. size).

the plant increased in age and in size, the cutting of its fronds also became more distinct, for, while they retained the glaucous (bluish-green) colour of those of *P. aureum*, and were produced from a similarly thick, fleshy rhizome

clothed with silvery scales, they were divided quite as much as those of *P. v. elegantissimum*, and they eventually became of a broader and more triangular shape, their leafy portion measuring 9in. each way. The leaflets are now so closely set as to be almost overlapping; they are divided into pinnules (leafits) 3in. to 4½in. long, and these are again cut into deeply-cleft, undulated lobes of a most pleasing nature, a character which the plant has developed only after the drawing (Fig. 60) had been made. The fronds are borne on comparatively short, round stalks of a stiff, wiry nature, and 6in. to 9in. in length: these, in their young state, show a few white, chaffy scales, similar to those seen in *P. aureum*. It is too soon to speculate on the sporidiferous character of this hybrid in relation to either of its supposed parents, as the plant has not yet produced fertile fronda.

P. (Phymatodes) Schomburgkianum — Phy-mat-o′-dēs; Schom-burgk-ĭ-a′-num (Schomburgk's), *Kunze*.

The undivided fronds of this stove species, native of Guiana and the Amazon Valley, are produced from a rhizome sometimes 1in. thick and densely clothed with spear-shaped scales; they are borne on firm, upright stalks 1in. to 2in. long, and measure sometimes 1½ft. in length and 3in. in breadth at their middle, being narrowed at both ends. Their texture is leathery, they are naked on both sides, and their margin is so thickened that no distinct main veins are apparent. The sori (spore masses), large and not immersed, are disposed in single rows not far from the midrib.—*Hooker*, *Species Filicum*, v., p. 68.

P. (Phymatodes) Schraderi—Phy-mat-o′-dēs; Schra′-der-i (Schrader's), *Mettenius*.

This is a small-growing species, of botanical interest only. Its somewhat leathery fronds, seldom more than 5in. long, are gradually narrowed both ways, and have large spore masses disposed in a single row on each side of, and close to the midrib. It is a native of Cape Colony and Natal.—*Hooker*, *Species Filicum*, v., p. 59.

P. scolopendrioides—scol-op-en′-drĭ-ŏ-i′-des (Scolopendrium-like). This is synonymous with *P. trifurcatum*.

P. (Goniophlebium) Scouleri — Go-nĭ-oph-leb′-ĭ-um ; Scou′-ler-i (Scouler's), *Hooker and Greville.*

This greenhouse species, in general habit much resembling our common Polypody, is a native of North-west America. Eaton, in his exhaustive work on "Ferns of North America," states that, in the vicinity of Mount Shasta and Crescent City, California, and northwards to British Columbia, it is found growing on trees and stumps, less frequently on the ground. Its simply-pinnate fronds, borne on firm, naked stalks 3in. to 4in. long, are produced from a stout, wide-creeping rhizome clothed with spear-shaped scales of a rusty-brown colour. They are 6in. to 12in. long, 4in. to 8in. broad, and cut down to the rachis into closely-set, blunt leaflets of a very leathery texture, dark green, and naked on both sides. The very large and prominent sori (spore masses) are found mostly on the upper leaflets, or sometimes towards the ends of most of them, and disposed in a single, regular row on each side of and close to the midrib.—*Hooker*, *Species Filicum*, v., p. 19. *Hooker and Greville*, *Icones Filicum*, t. 56. *Nicholson*, *Dictionary of Gardening*, iii., p. 193. *Eaton*, *Ferns of North America*, i., t. 26.

P. sechellarum—se-chel-la′-rum (from the Seychelles), *Baker.*

A small-growing, stove species, of purely botanical interest, with strap-shaped, pendulous fronds of a rigid and somewhat leathery texture, thinly clothed on both surfaces, especially at the edge, with fine, soft, brown hairs. It is a native of the Seychelles and Mauritius.—*Hooker*, *Synopsis Filicum*, p. 508.

P. Seemannii—See-man′-nĭ-i (Seemann's). A synonym of *P. blechnoides.*

P. (Phymatodes) selligueoides — Phy-mat-o′-dēs ; sel-li-guĕ-ŏ-ĭ′-des (Selliguea-like), *Baker.*

This small-growing, stove species, native of New Caledonia, is of little decorative value, as its spear-shaped fronds, sharp-pointed at their summit and gradually narrowed at the base, are seldom more than 6in. in length and barely 1in. in breadth.—*Hooker*, *Synopsis Filicum*, p. 513.

P. sepultum—sep-ul′-tum (inclosed). This is a variety of *P. lepidopteris.*

P. sericeo-lanatum—se-ric′-ĕ-o-la-na′-tum (silky-woolly), *Hooker*.

A distinct-looking, stove species, native of the Andes of Columbia and Ecuador, with flaccid, drooping fronds 1ft. to 2ft. long, 1½in. to 3in. broad, divided to the rachis into blunt, entire leaflets about 1in. long, of a thick texture, and densely matted on both sides with soft, silky hairs of a greyish colour. The spore masses are disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 221.

P. (Niphobolus) serpens—Niph-ob′-ol-us ; ser′-pens (creeping), *Forster*.

This greenhouse species, usually found in gardens under the name of *Niphobolus rupestris*, is a native of Australia and New Zealand. It produces from a wide-creeping rhizome clothed with scales of a rusty-brown colour its small, round, barren fronds and its longer and narrower fertile ones, sometimes 6in. long and seldom more than ½in. broad. Both kinds are of a leathery texture and have their under-surface densely coated with a whitish substance of a woolly nature. The large and prominent sori (spore masses) ultimately cover the whole of the upper part of the fertile fronds. *P. serpens* of Swartz is synonymous with *P. Swartzii*, a plant of smaller dimensions.—*Hooker*, *Species Filicum*, v., p. 46. *Lowe*, *Ferns British and Exotic*, i., t. 20. *Nicholson*, *Dictionary of Gardening*, iii., p. 193.

P. (Goniophlebium) serratifolium—Go-nĭ-oph-leb′-ĭ-um ; ser-ra-tif-ol′-ĭ-um (saw-toothed-leaved). A variety of *P. subauriculatum*.

P. serrulatum—ser-rul-a′-tum (slightly saw-edged), *Mettenius*.

A stove species, of botanical interest only, with fronds seldom exceeding 6in. in length. It has a range of habitat extending from the West Indies and Mexico to Brazil, Peru, and Juan Fernandez ; it is also found in Madagascar, Mauritius, and the Sandwich Islands.—*Hooker*, *Species Filicum*, iv., p. 174. *Nicholson*, *Dictionary of Gardening*, iii., p. 193.

P. (Grammitis) sessilifolium—Gram-mi′-tis ; ses-sil-if-ol′-ĭ-um (stalkless-leaved), *Hooker*.

This stove species, native of Malaysia and the Philippine Islands, is of small dimensions. Its entire fronds, gradually narrowed below the point, bluntish, and with the edge slightly undulated, measure from 3in. to 6in. in

length and barely ¼in. in breadth; their texture is somewhat leathery and both sides are naked. The abundant oblong sori (spore masses) are placed end to end in two long rows close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 168, t. 272A.

P. setigerum—se-tig′-er-um (bristly), *Blume*.

A stove species, native of Java, with entire (undivided) fronds 8in. to 12in. long and ½in. to ¾in. broad, borne on densely-tufted stalks 2in. to 3in. long thickly clothed with long, soft hairs of a rusty-brown colour. They are sharp-pointed at the extremity, and the lower part is narrowed rather suddenly; they are of a somewhat leathery texture and thinly clothed on both surfaces with long, soft hairs like those of the stalks. The numerous round sori (spore masses) are disposed in long rows close to the midrib.—*Hooker*, *Species Filicum*, iv., p. 171; *Second Century of Ferns*, t. 41.



Fig. 61. Polypodium sinuosum (⅓ nat. size).

P. Sieberianum—Sie-ber-ĭ-a′-num (Sieber's). This is synonymous with *P. cyatheæfolium*.

P. simplex—sim′-plex (simple, undivided). A variety of *P. lineare*.

P. (Phymatodes) sinuosum—Phy-mat-o′-dēs; sin-ŭ-o′-sum (wavy-edged), *Wallich*.

This small-growing, stove species, native of Malaysia, the New Hebrides, and the Solomon Islands, is very distinct through its barren and fertile fronds being totally dissimilar. The former, 3in. to 6in. long and ½in. to 1in. broad, have their edge entire, whereas the fertile ones are longer and have their edge undulated. Both fronds are of a leathery texture and naked on both sides. Their large, round or oblong spore masses are situated at or near the margin of the frond, in which they are immersed. Fig. 61 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, v., p. 61, t. 274. *Nicholson*, *Dictionary of Gardening*, iii., p. 193. *Beddome*, *Ferns of British India*, t. 8.

P. Skinneri—Skin′-ner-i (Skinner's), *Hooker.*

A stove species, native of Guatemala, producing from a wide-creeping rhizome clothed with broad, pale scales, fronds 6in. to 9in. long and 1½in. to 2in. broad. These, borne on rigid stalks 2in. long, are cut down nearly or quite to the rachis into numerous close, narrow, slightly-notched leaflets of a somewhat leathery texture, and thinly clothed on their under-surface with minute scales. The spore masses are disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 276B.

P. solidum—sol′-id-um (firm), *Mettenius.*

The fronds of this stove species, native of Java, are produced from a stout rhizome clothed with rusty-brown scales, and borne on firm, erect, naked stalks 1in. long. They are from 6in. to 8in. long, ¾in. broad, and cut down nearly to the rachis into close, distinctly-toothed, bluntish lobes of a leathery texture and naked on both sides. The spore masses are disposed in one regular row on each side of the midvein.—*Hooker*, *Species Filicum*, iv., p. 193.

P. (Phymatodes) soridens—Phy-mat-o′-dēs ; sor′-id-ens (having toothed sori), *Hooker.*

A stove species, of small dimensions, native of Borneo, producing from a wide-creeping rhizome clothed with rough, reddish scales, its rigid, leathery fronds, 4in. to 12in. long, ¼in. to ½in. broad, very gradually narrowed to both ends, and glossy on both sides. The barren ones are entire, while the fertile ones are undulated, forming lobes in each of which one spore mass is immersed ; these produce a very distinct, nipple-like appearance on the upper surface.—*Hooker*, *Species Filicum*, v., p. 61, t. 283B.

P. sororium—sor-o′-rĭ-um (related), *Humboldt, Bonpland, and Kunth.*

A stove species, native of Cuba, Mexico, and Peru, with fronds 1ft. to 2ft. long, 6in. to 9in. broad, borne on erect, naked stalks 6in. to 12in. long, and produced from a stout, wide-creeping rhizome densely clothed with small, pale brown scales. The lowest leaflets, which are the largest and stalkless, often measure 6in. in length ; they are sharp-pointed and slightly undulated at the edge, of a soft, papery texture, and naked on both sides. The spore masses are disposed in distinct rows nearer the midrib than the edge.—*Hooker*, *Species Filicum*, iv., p. 219. *Nicholson*, *Dictionary of Gardening*, iii., p. 193.

P. (Dictyopteris) sparsiflorum — Dic-tŷ-op′-ter-is ; spar-sif-lo′-rum (having scattered flowers), *Hooker.*

This robust-growing, stove species, native of Sierra de Crystal and Old Calabar, West Tropical Africa, produces from a thick and conspicuously-knotted rhizome its fronds 2ft. to 3ft. long and 1ft. or more in breadth. These are borne on stalks 1½ft. long, and furnished with leaflets 7in. to 8in. long, 1½in. to 2in. broad, sharp-pointed at their summit, narrowed at the base, of a soft, papery texture, and naked on both sides. The small and abundant sori (spore masses) are irregularly scattered over the whole under-surface.—*Hooker, Species Filicum*, v., p. 92.

P. spectabile — spec-ta′-bil-ĕ (remarkable). This is synonymous with *Nephrodium villosum.*

P. (Phymatodes) spectrum — Phy-mat-o′-dēs ; spec′-trum (spectral), *Kaulfuss.*

This stove species, better known in gardens under the name of *Colysis spectra*, is a plant of distinct appearance, native of the Sandwich Islands. Its fronds, produced from a creeping rhizome of a woody nature, and borne on erect, naked stalks 3in. to 4in. long, are somewhat halbert-shaped, their central lobe being sharp-pointed, while the lateral ones are sometimes rounded ; they are of a firm texture and naked on both sides. The small and abundant spore masses are irregularly scattered over the whole under-surface.—*Hooker, Species Filicum*, v., p. 74.

P. (Drynaria) splendens—Dryn-a′-rĭ-a ; splen′-dens (splendid), *Hooker.*

In this stove species, native of Singapore and the Philippines, the fronds, which are produced from a rhizome of a woody nature and clothed with grey scales, are barren in their lower part and fertile in their upper portion only ; they are almost stalkless, 2ft. to 3ft. long and 1ft. or more in breadth. The barren leaflets are 4in. to 8in. long, 1in. to 2in. broad, and closely set, while the fertile ones, though of the same length, are distant, strap-shaped, and only ¼in. to ½in. broad. The abundant oblong spore masses fill up the whole under-surface of the fertile leaflets except the midrib.—*Hooker, Species Filicum*, v., p. 96.

P. (Phegopteris) splendidum — Phe-gop′-ter-is ; splen′-did-um (splendid), *Kaulfuss.*

A stove species, of large dimensions and somewhat arborescent habit, native of Brazil, where it is said to be common. Its ample and much-divided fronds, 4ft. to 6ft. long, borne on strong, smooth stalks 2ft. or more in length, have their lower leaflets 1ft. to 1½ft. long, 6in. to 8in. broad, and furnished with distinct leafits, which are again divided into numerous blunt, entire lobes of a soft, papery texture, and slightly hairy underneath. The spore masses are disposed in a row on each side of and close to the midrib. —*Hooker*, *Synopsis Filicum*, p. 312.

P. sporadocarpum—spor-ad-oc-ar′-pum (spore-fruited). This is a variety of *P. aureum.*

P. sporadolepis—spor-ad-ol′-ep-is (having scaly spores), *Kunze.*

This is a stove species, native of Colombia and Ecuador, closely resembling *P. plebeium*, but of a slenderer habit, and furnished with narrower, distant leaflets and an ebeneous (blackish) rachis.—*Hooker*, *Synopsis Filicum*, p. 336.

P. Sprucei—Spru′-cĕ-i (Spruce's), *Hooker.*

A stove species, of botanical interest only, with entire fronds, seldom more than 2in. high and very hairy on both sides. It is a native of Eastern Peru.—*Hooker*, *Species Filicum*, iv., p. 172.

P. (Goniophlebium) squamatum—Go-nĭ-oph-leb′-ĭ-um ; squa-ma′-tum (scaly), *Linnæus.*

This stove species, native of the West Indies, Mexico, and Peru, is provided with a stout, wide-creeping rhizome clothed with spear-shaped scales, from which its fronds, borne on rigid stalks 6in. to 12in. long and of a scaly nature, are produced. These fronds are 6in. to 12in. long, 2in. to 4in. broad, and cut down nearly or quite to the rachis into bluntish leaflets 1in. to 2in. long, dilated and often united at the base. The under-surface is densely coated with minute scales of a rough nature, and the large and copious spore masses are disposed in one row on each side of the midvein.—*Hooker*, *Species Filicum*, iv., p. 209. *Nicholson*, *Dictionary of Gardening*, iii., p. 193.

P. squamulosum—squa-mul-o′-sum (scaly), *Kunze.*

A stove species, of small dimensions, native of Brazil and St. Catharine's Island; it is a very interesting and distinct Fern, and was introduced into the Royal Gardens, Kew, in 1843. Its barren and fertile fronds are totally dissimilar: the former are spathulate (spoon-shaped) and about 3in. long; the latter, on the contrary, are so contracted as to become quite strap-shaped and almost linear. Both kinds are of a leathery texture, whitish in the young state, but becoming pale brown with age. The spore masses, of a conspicuous bright yellow colour, are disposed in one row on each side of the midrib. The venation is, like that of *P. lycopodioides*, very pretty, but, the fronds being less transparent, the veins are not so plainly visible.—*Lowe, Ferns British and Exotic*, i., t. 50; ii., t. 39B.

P. (Goniopteris) stegnogrammoides—Go-nĭ-op′-ter-is; steg-nog-ram-mŏ-ī′-des (Stegnogramma-like), *Baker.*

This stove species, native of the Sandwich Islands, is of a somewhat arborescent habit and large dimensions. Its simply-pinnate fronds, borne on firm, upright stalks 1½ft. to 2ft. long, are 2ft. to 3ft. long and 1ft. or more broad. Their leaflets are 6in. to 9in. long, 1½in. broad, sharp-pointed at the apex, bluntly lobed about a quarter of the way down, of a somewhat leathery texture, and slightly hairy underneath. The spore masses are disposed in rows near the midrib. *P. sandvicense* of Hooker is identical with this species.—*Hooker, Species Filicum*, v., p. 5.

P. (Phymatodes) stenophyllum — Phy-mat-o′-dēs; sten-oph-yl′-lum (narrow-leaved), *Blume.*

This stove species, native of Malaysia and the Philippine Islands, is provided with a moderately thick, wide-creeping rhizome densely clothed with narrow scales of a pale colour, from which the entire fronds, borne on firm stalks 1in. or more long, are produced. These fronds are 4in. to 9in. long, ¼in. to ½in. broad, and gradually narrowed to both ends; they are of a very leathery texture and naked on both sides. The spore masses, which form a single row close to the edge, are completely immersed and very prominent on the upper side.—*Hooker, Species Filicum*, v., p. 65. *Beddome, Ferns of British India*, t. 234.

P. (Phymatodes) stigmaticum — Phy-mat-o′-dēs ; stig-mat′-ic-um (dotted), *Presl.*

A stove species, of small dimensions and of botanical interest only, native of Colombia. Its nearly stalkless, entire fronds (Fig. 62), 4in. to 5in. long and about 1in. broad, are produced from a wide-creeping, slender, scaly rhizome ; they are rounded at the extremity, gradually narrowed towards the base, of a somewhat leathery texture, and naked on both sides. The spore masses are disposed on the connected veinlets. This species is closely related to the better-known *P. lycopodioides*, but is of thinner texture.—*Hooker*, *Species Filicum*, v., p. 36. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.



Fig. 62. Frond of Polypodium stigmaticum (½ nat. size).

P. (Niphobolus) stigmosum — Niph-ob′-ol-us ; stig-mo′-sum (dotted), *Swartz.*

This stove species, native of Malaysia, New Guinea, and Northern India, where it is said to occur up to 2000ft. elevation, may be readily distinguished from all other species belonging to the group by the much larger size of its fronds, which are 1½ft. to 2ft. long, 2in. to 3in. broad, and borne on firm, erect stalks 1in. to 6in. long ; they are sharp-pointed at the summit, gradually narrowed at the lower part, of a somewhat leathery texture, smooth on the upper surface, and woolly underneath. The very small, quite continuous sori (spore masses) are disposed in several rows, sometimes covering the whole frond, except the very base.—*Hooker*, *Species Filicum*, v., p. 50. *Nicholson*, *Dictionary of Gardening*, iii., p. 194. *Beddome*, *Ferns of British India*, t. 120.

P. (Goniophlebium) subauriculatum — Go-nĭ-oph-leb′-ĭ-um ; sub-aur-ic-ul-a′-tum (slightly eared), *Blume.*

This stove species, native of Malaysia and the Philippine Islands, is probably one of the best-known and most extensively cultivated of the whole genus. It is a very useful and decorative plant, and as a basket Fern for the warm house it has hardly any equal (see Plate), its graceful fronds, which are produced from a wide-creeping rhizome clothed with small, dull-coloured

scales, attaining 8ft. to 10ft. or more in length and 8in. to 12in. in breadth. They are borne on firm, naked stalks 6in. to 12in. long and of a glossy nature; their leaflets, 4in. to 6in. long and ½in. to 1in. broad, are slightly toothed in young plants, whereas in older specimens the fronds have their leaflets set farther apart and narrower, with smooth edges, rounded or even auricled (eared) at the base. The sori (spore masses), as in several other species, are immersed in the leaflets, forming little protuberances on their upper surface. *P. Reinwardtii* is synonymous with this species.—*Hooker*, *Species Filicum*, v., p. 32. *Nicholson*, *Dictionary of Gardening*, iii., p. 194. *Lowe*, *Ferns British and Exotic*, i., t. 37. *Beddome*, *Ferns of British India*, t. 78.

P. subauriculatum is a Fern which can with great advantage be utilised for covering dead trunks of Tree Ferns; in such positions it makes a very beautiful object and grows apace, as it delights in sending its roots and rhizomes into partly-decayed vegetable matter. In the centre of a warm conservatory it makes a Fern surpassing all others in elegance, and where there is plenty of height to allow the fronds space to hang, a specimen with numberless fronds 10ft. to 12ft. long is a sight not easily forgotten. If grown in a basket, it will derive great benefit from a small portion of chopped sphagnum added to the mixture of soil, and will stand a fair amount of strong light.

P. s. serratifolium — ser-ra-tif-ol′-ĭ-um (having saw-toothed leaves), *Brackenridge.*

This variety differs from the typical species in having the leaflets of its fronds deeply toothed.

P. subdigitatum—sub-dig-it-a′-tum (almost digitate), *Blume.*

A beautiful and well-marked, greenhouse species, native of Northern India, being found in Nepaul and Sikkim at elevations varying between 7000ft. and 8000ft. Its ample, much-divided fronds, borne on firm, naked stalks 1ft. or more in length, are 2ft. or more in length and 1ft. to 1½ft. broad. The lower leaflets are the largest, frequently measuring 9in. in length and 4in. in breadth. The leaflets are cut into spear-shaped leafits often 2in. long, which in their turn are subdivided into segments with blunt lobes. They

are of a soft, papery texture and dark green colour, and the spore masses are disposed at their extremity.—*Hooker*, *Species Filicum*, iv., p. 256. *Beddome*, *Ferns of British India*, t. 259.

P. subfalcatum—sub-fal-ca′-tum (somewhat sickle-shaped), *Blume*.

This distinct, greenhouse species, of small dimensions, is a native of Northern India, occurring at various elevations up to 8000ft. Its erect and somewhat hairy fronds, 6in. to 9in. long and ¾in. to 1in. broad, are borne on stalks less than 1in. long, thinly clothed with soft, spreading hairs. The close, spreading, sharply-toothed leaflets are of a soft, papery texture, and slightly hairy on both sides. The small, round spore masses are disposed in rows, one to each tooth, half-way between the midrib and the margin. Fig. 63 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker*, *Species Filicum*, iv., p. 193. *Nicholson*, *Dictionary of Gardening*, iii., p. 194. *Beddome*, *Ferns of British India*, t. 76.



Fig. 63. Polypodium subfalcatum (½ nat. size).

P. (Niphobolus) subfurfuraceum—Niph-ob′-ol-us ; sub-fur-fur-a′-cĕ-um (somewhat scurfy), *Hooker*.

A strong-growing species, producing from a short-creeping rhizome its entire fronds 1½ft. to 2ft. long, 4in. to 5in. broad, sharp-pointed at their summit, gradually narrowed at their lower part, of a leathery texture, naked on their upper surface, but somewhat rough with a woolly substance underneath. The spore masses are disposed in one or two irregular rows of six to ten each.—*Hooker*, *Species Filicum*, v., p. 52. *Beddome*, *Ferns of British India*, t. 259.

P. (Phegopteris) submarginalis—Phe-gop′-ter-is ; sub-mar-gin-a′-lis (nearly marginal), *Langsdorff and Fischer*.

A stove species, native of Brazil and Venezuela, with fronds 2ft. long and 8in. to 10in. broad ; their leaflets, 4in. to 5in. long, are deeply cleft into

somewhat sickle-shaped segments, along the margins of which the spore masses are disposed in a regular line, and so closely as to eventually become confluent.—*Lowe, Ferns British and Exotic*, ii., t. 49.

P. subpetiolatum—sub-pet-i-ol-a′-tum (short-stalked), *Hooker.*

This robust-growing, stove species is a native of Mexico, Guatemala, and Cuba, and, according to Lowe, was introduced into the Royal Gardens, Kew, in 1845. Its simply-pinnate fronds, of a particularly arching habit, are produced from a stout, underground, fleshy rhizome, densely clothed with rusty-brown scales. They are borne on very short stalks, measure 3ft. or more in length and 6in. to 8in. in breadth, and are furnished with numerous closely-set leaflets 3in. to 4in. long and destitute of a footstalk. The leaflets are bluntish at their extremity, rounded or slightly eared at the base, of a pale green colour, and peculiarly soft in texture. The spore masses are disposed in rows nearer the midrib than the edge.—*Hooker, Species Filicum*, iv., p. 220. *Nicholson, Dictionary of Gardening*, iii., p. 194. *Lowe, Ferns British and Exotic*, ii., t. 11.

P. s. biserratum—bis-er-ra′-tum (twice-serrated), *Mertens and Galeotti.*

Mr. Baker gives this as merely a variety of the above, with fronds much more elongated, leaflets more numerous, and spore masses more distant.—*Hooker, Synopsis Filicum*, p. 337.

P. subpinnatifidum — sub-pin-na-tif′-id-um (somewhat deeply cleft), *Hooker.*

A small-growing, stove species, native of Java and the Sandwich Islands. It has almost stalkless fronds, 4in. to 6in. long, cut down nearly to the rachis into lobes, the upper edge of which is nearly straight and horizontal, and the lower one very oblique ; they are of a somewhat leathery texture and naked on both sides. The spore masses are disposed one in each lobe.—*Hooker, Species Filicum*, iv., p. 177.

P. subserratum—sub-ser-ra′-tum (somewhat saw-edged), *Hooker.*

This stove species, native of Borneo, produces from a creeping rhizome fronds 8in. long and 2in. broad, cut down nearly to the rachis into close,

blunt, entire lobes only ¼in. broad. They are borne on erect, rigid, slender stalks 4in. to 5in. long, clothed with short, black hairs, are of a soft, papery texture, and are naked on both sides.—*Hooker*, *Species Filicum*, iv., p. 202.

P. subsessile—sub-ses′-sil-ĕ (almost stalkless), *Baker*.

A stove species, native of Colombia, Guiana, and Ecuador, having distinctly-pinnate fronds 6in. to 18in. long and 1½in. to 2in. broad, and with scarcely any stalk. The distant, linear, bluntish leaflets are entire or slightly notched, and suddenly enlarged at the base so as to be almost or quite connected; the lower ones are reduced to a mere zigzag wing to the rachis. The fronds are of a soft, papery texture, naked or even glossy on both sides, and the spore masses are disposed in two long rows.—*Hooker*, *Species Filicum*, iv., p. 192, t. 275B.

P. (Phymatodes) superficiale — Phy-mat-o′-dēs; sup-er-fic-ĭ-a′-lĕ (superficial), *Blume*.

A greenhouse species, of little decorative value, with entire fronds gradually narrowed at both ends; it is characterised in the group by its large, copious, irregularly-scattered spore masses. It is a native of Northern India, where it is found at various elevations from 3000ft. to 6000ft.—*Hooker*, *Species Filicum*, v., p. 71. *Beddome*, *Ferns of British India*, t. 75.

P. (Goniophlebium) surrucuchense — Go-nĭ-oph-leb′-ĭ-um; sur-ru-cuch-en′-sĕ (native of Surrucuchu), *Hooker*.

In this stove species, native of Ecuador and the West Indies, the distinctly-pinnate fronds, borne on firm, naked stalks 6in. to 12in. long and of a glossy nature, are produced from a stout rhizome densely clothed with grey, spear-shaped scales; they are from 1ft. to 2ft. long, 8in. to 12in. broad, and furnished with numerous leaflets 4in. to 6in. long, of a leathery texture, and naked on both sides, with prominent spore masses disposed in a single series.—*Hooker*, *Species Filicum*, v., p. 30; *Icones Filicum*, t. 69. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.

P. (Phymatodes) Swartzii—Phy-mat-o′-dēs; Swartz′-ĭ-i (Swartz's), *Baker*.

A stove species, of botanical interest only, also known as *P. serpens* of Swartz, native of Cayenne and the West Indies. It produces from a slender,

wide-creeping rhizome its entire, nearly stalkless fronds, seldom more than 4in. long.—*Hooker*, *Species Filicum*, v., p. 35. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.

P. sylvaticum — syl-vat′-ic-um (sylvan). This is a form of *Aspidium aculeatum*.

P. (Phegopteris) tarapotense—Phe-gop′-ter-is ; ta-ra-pot-en′-sĕ (from Tarapota), *Baker*.

The handsome and much-divided fronds of this stove species, native of the Andes of East Peru, are borne on stout, brown stalks 1ft. or more in length, clothed with large, brown, spear-shaped scales ; they are 2ft. to 2½ft. long, 1ft. broad, oblong, and tripinnatifid (three times divided nearly to the midrib). The short-stalked, spear-shaped leaflets are cut down to the rachis into notched, bluntish leafits of a moderately firm texture, dark green on both sides, and slightly hairy on their under-surface. The sori (spore masses) are disposed in a single series midway between the midrib and the edge of the leafits.—*Hooker*, *Synopsis Filicum*, p. 505.

P. (Dictyopteris) Tatei—Dic-tў-op′-ter-is ; Ta′-te-i (Tate's), *Baker*.

A stove species, native of Chontales, Nicaragua, with fronds pinnate (divided to the midrib) in the lower part only, their upper half showing only short, blunt lobes. These fronds are borne on naked stalks 6in. or more in length, and their leafy portion measures 2ft. to 3ft. in length and 1ft. to 1½ft. in breadth ; they are of a firm, parchment-like texture and dark green in colour, and the scantily-produced spore masses are irregularly scattered, mostly near or at the edge.—*Hooker*, *Synopsis Filicum*, p. 506.

P. taxifolium—tax-if-ol′-ĭ-um (Yew-leaved), *Linnæus*.

This distinct, small-growing, stove species, native of Guatemala, Ecuador, and South Brazil, produces from a stout, scaly rhizome fronds 6in. to 12in. long, 1½in. to 3in. broad, and cut down to the rachis into close, entire, blunt leaflets seldom more than ⅛in. broad. These leaflets are of a somewhat leathery texture, dark green in colour, and bear their spore masses close to the midveins.—*Hooker*, *Species Filicum*, iv., p. 200.



POLYPODIUM NIGRESCENS

P. tenellum—ten-el′-lum (very tender), *Forster*.

This very distinct, greenhouse species, native of Australia, New Zealand, and New Caledonia, is provided with a wide-climbing rhizome of a woody nature, from which the fronds, borne on firm, nearly naked stalks 2in. to 3in. long and jointed near the base, are produced. These fronds are, when fully developed, of a naturally drooping habit, 1ft. to 2ft. long, 2in. to 4in. broad, and furnished with entire or slightly-notched leaflets 2in. to 3in. long, narrowed to both ends, of a soft, papery texture, and naked on both sides. The spore masses are disposed in rows near the edge. *P. Filipes* is a name applied to this plant when in a young state (Fig. 64).—*Hooker*, *Species Filicum*, iv., p. 217. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.



Fig. 64. Rhizome, with Fronds, of Polypodium tenellum, in a young state (much reduced).

P. (Dictyopteris) tenerifrons — Dic-tŷ-op′-ter-is; ten-er′-if-rons (tender-fronded), *Hooker*.

A distinct-looking, stove species, native of Moulmein and West Tropical Africa, with fronds deltoid (in shape of the Greek delta, Δ), produced from a small, creeping rhizome of a fragile nature, and borne on tender stalks 8in. to 12in. long. They are 6in. to 12in. each way, distinctly pinnate in their lower part, and pinnatifid only in their upper portion; their texture is very thin and their colour bright green. The spore masses are disposed in rows near the main veins.—*Hooker*, *Species Filicum*, v., p. 104. *Beddome*, *Ferns of British India*, t. 4.

P. tenuifolium—ten-ŭ-if-ol′-ĭ-um (slender-fronded), *Humboldt*, *Bonpland*, *and Kunth*.

The distinctly-pinnate fronds of this stove species, native of the West Indies and Colombia, are produced from a stout rhizome clothed with reddish-brown scales, and borne on slender, naked, erect stalks 2in. to 3in. long; they are 8in. to 12in. long, 1½in. to 2in. broad, and cut down to the rachis into distant, narrow leaflets of a soft, papery texture and naked on both sides. The slightly-immersed spore masses are disposed in two rows of six to ten each to a leaflet. *P. Otites* is identical with this species.—*Hooker*, *Species Filicum*, iv., p. 192. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.

P. tetragonum — tet-rag-o′-num (four-angled). A garden synonym of *P. androgynum.*

P. Thwaitesii—Thwaites′-ĭ-i (Thwaites's), *Beddome.*

This small-growing, stove species is of botanical interest only, its somewhat spear-shaped, blunt, leathery fronds, of a dull green colour, being seldom more than 4in. in length. It is a native of Ceylon.—*Beddome, Ferns of British India*, t. 188. *Hooker, Synopsis Filicum*, p. 508.

P. (Goniophlebium) thyssanolepis—Go-nĭ-oph-leb′-ĭ-um ; thys-san-ol′-ep-is (having fringed scales), *A. Brongniart.*

A small-growing, stove species, native of Mexico and Peru, provided with a slender yet firm, wide-creeping rhizome, from which the fronds, borne on stiff, erect stalks 3in. to 12in. long and of a scaly nature, are produced. These fronds are 3in. to 9in. long, 2in. to 4in. broad, and only once divided to the midrib, with blunt, ascending, strap-shaped leaflets, all except the lowest enlarged at the base ; they are of a thick and somewhat leathery texture, dull green, and nearly naked on their upper surface, while their under-side is densely clothed with small, distinctly-fringed scales. The spore masses are disposed in a single series near the midveins.—*Hooker, Synopsis Filicum*, p. 512. *Nicholson, Dictionary of Gardening*, iii., p. 194.

P. (Goniopteris) tomentosum — Go-nĭ-op′-ter-is ; to-men-to′-sum (downy), *Bory.*

This distinct, stove species, native of Madagascar, produces fronds 1ft. long and 6in. to 9in. broad, on rather slender, erect, short stalks of a densely hairy nature. The lowest leaflets, which are the largest, are distinctly stalked, 3in. to 4in. long, about ¾in. broad, and have their edge nearly entire or slightly lobed. The fronds are of a soft though rather thick texture, and clothed on both surfaces with soft, brown hairs. The small and abundant spore masses are scattered over the whole of the under-surface.—*Hooker, Species Filicum*, v., p. 14.

P. tovarense—to-va-ren′-sĕ (from Tovar, Colombia), *Klotzsch.*

A stove species, of medium dimensions, with fronds of a flaccid nature, borne on very short, wiry, naked stalks. These fronds are 4in. to 12in. long,

½in. broad, and cut down nearly to the rachis into lobes nearly as broad as deep, irregular in shape, and notched on their upper edge; their texture is somewhat leathery, their colour pale green, and they are naked on both sides. The large and conspicuous spore masses are arranged one to three in the centre of the lobes.—*Hooker*, *Synopsis Filicum*, p. 324.

P. trichodes—trich-o′-des (hair-like), *Reinwardt.*

The natural habitat of this magnificent, delicate-looking, greenhouse species is somewhat doubtful, for, while Nicholson gives it as a native of the East Indies and dates its introduction into this country to 1840, Lowe states that "*P. trichodes* came up spontaneously at the Royal Gardens, Kew, in the year 1849." In general appearance it is not unlike a gigantic *Asplenium* (*Athyrium*) *Filix-fœmina*. Its handsome fronds, borne on strong stalks scaly at the base and hairy upwards, are from 3ft. to 5ft. long, twice or three times divided to the midrib, and furnished with finely-cut, bluntly-lobed segments; they are of a soft, papery texture, vivid green in colour, and smooth on both sides. The abundant round, brownish spore masses are disposed one to five to a segment.—*Lowe*, *Ferns British and Exotic*, ii., t. 2. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.

P. trichomanoides—trich-om-an-ŏ-i′-des (Trichomanes-like), *Swartz.*

A stove species, of little decorative value, its simply-pinnate fronds, of a somewhat leathery texture and slightly hairy on both sides, being seldom more than 4in. long, and borne on tufted, short stalks clothed with soft, spreading hairs. It is a native of Cuba, Brazil, Ecuador, Juan Fernandez, Ascension Island, &c.—*Hooker*, *Species Filicum*, iv., p. 178. *Nicholson*, *Dictionary of Gardening*, iii., p. 194. *Beddome*, *Ferns of British India*, t. 2.

P. (Niphobolus) tricuspe—Niph-ob′-ol-us; tric-us′-pĕ (three-pointed), *Swartz.*

This greenhouse species, native of Japan and Korea, is the only one of the group in which the fronds are not quite entire. These are produced from a stout, woody rhizome, and borne on firm, erect stalks 6in. to 8in. long. Their leafy portion, 2in. to 4in. each way, halbert-shaped, and of a leathery texture, is naked and dark green on their upper surface, and densely matted

underneath ; the central lobe is broadly spear-shaped, and the lateral ones, spreading and much smaller, are distinctly auricled (eared) at the base. The minute and abundant spore masses are disposed in rows of three or four between the main veins and of nine to twelve between the midrib and the edge.—*Hooker*, *Species Filicum*, v., p. 44.

P. (Phymatodes) trifidum—Phy-mat-o′-dēs ; trif′-id-um (thrice-cut), *Don.*

This greenhouse species, of medium dimensions, also known in gardens under the name of *P. oxylobum*, is a native of China, Japan, and Northern India, where it is found up to 7000ft. elevation. Its fronds, 6in. to 12in. long and 6in. to 8in. broad, are produced from a stout rhizome clothed with narrow, rough scales of a rusty-brown colour, and borne on firm, erect stalks 3in. to 6in. long and of a glossy nature ; they are composed of a terminal lobe and from one to five pairs of similar lateral ones, 4in. to 6in. long and narrowed to the point. The fronds are of a leathery texture, naked on both sides, and have their spore masses disposed in a single series, and one only between each main vein.—*Hooker*, *Species Filicum*, v., p. 77. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.

P. trifurcatum—trif-ur-ca′-tum (thrice-forked), *Linnæus.*

This stove species, native of Jamaica, whence it was introduced into England in 1824, is also known under the name of *P. scolopendrioides.* Its specific name, *trifurcatum*, was founded on a forked form figured by Plumier. Its fronds, borne on stalks 3in. to 5in. long and more or less hairy, are produced from stout, creeping rhizomes densely clothed with narrow scales. They are 6in. to 9in. long, 1in. or more in breadth, and cut into broad, blunt, entire lobes of a leathery texture and naked on both sides. The abundant and conspicuous spore masses are disposed in two rows in each lobe and immersed.—*Hooker*, *Species Filicum*, iv., p. 194. *Nicholson*, *Dictionary of Gardening*, iii., p. 194. *Lowe*, *Ferns British and Exotic*, ii., t. 41A.

P. (Goniophlebium) trilobum—Go-nĭ-oph-leb′-ĭ-um ; tril′-ob-um (three-lobed), *Cavanilles.*

A greenhouse species, native of Chili, producing from a stout, scaly rhizome broadly-triangular fronds 6in. to 12in. each way and borne on firm,

erect, glossy stalks 4in. to 6in. long. The fronds are formed of an entire or slightly-toothed terminal leaflet and one to three similar ones on each side; these are 3in. to 4in. long, of a somewhat leathery texture, and naked on both sides. The oblong spore masses are quite immersed.—*Hooker*, *Species Filicum*, v., p. 22.

P. (Phymatodes) triquetrum—Phy-mat-o′-dēs; tri-quet′-rum (three-sided), *Blume*.

The fronds of this stove species, native of Java, are produced from a stout, woody rhizome densely covered with blunt scales, and borne on firm, erect stalks 4in. to 8in. long. The barren and the fertile ones are distinct in shape, the former being 6in. to 9in. long, 2in. to 3in. broad, sharp-pointed, and with an entire edge; while the fertile ones are longer and narrower. Both are of a very leathery texture and naked on both sides. The spore masses, which are not immersed, are disposed in two close rows between the main veins, five to eight between the midrib and edge.—*Hooker*, *Species Filicum*, v., p. 63. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.

P. (Phegopteris) unidentatum—Phe-gop′-ter-is; u-nid-en-ta′-tum (once-toothed), *Hooker and Arnott*.

A stove species, of large dimensions, native of the Sandwich Islands, producing ample fronds 2ft. to 3ft. long, 1ft. or more in breadth, and deltoid (in shape of the Greek delta, Δ). These fronds are borne on tufted stalks 1ft. long, and clothed with rough, dark brown scales, especially towards their base. The lowest leaflets, which are the largest and of the same shape as the frond itself, are 6in. to 9in. long, 4in. to 5in. broad, and furnished with spear-shaped leafits, cut into distinct segments, which are deeply cleft, of a soft, papery texture, and naked on both sides. The spore masses are disposed close to the margin.—*Hooker*, *Species Filicum*, iv., p. 267. *Nicholson*, *Dictionary of Gardening*, iii., p. 194.

P. (Phegopteris) unisorum—Phe-gop′-ter-is; u-nis-or′-um (having one sorus), *Baker*.

This very distinct, little, stove species, native of the Sandwich Islands, is a botanical curiosity. Its oblong-spear-shaped fronds, 2in. to 3in. long and

1in. broad, borne on slender, tufted, dark purplish-brown stalks 1in. long, are composed of horizontal leaflets terminating in a roundish lobe, and are provided with one or two similar lobes on each side. These leaflets are of a leathery texture, naked on both sides, and have one large sorus (spore mass) at the base of each lobe.—*Hooker, Synopsis Filicum*, p. 307.

P. (Goniopteris) urophyllum — Go-nĭ-op′-ter-is ; u-roph-yl′-lum (tail-leaved), *Wallich.*

This strong-growing, stove species, native of Ceylon, Malaysia, and Queensland, produces from a creeping rhizome its fronds, which are 2ft. to 4ft. long, 1ft. to 1½ft. broad, and borne on stout, upright stalks 2ft. or more in length. They are composed of a terminal leaflet, and have usually several on each side, which are sometimes 1ft. long and more than 2in. broad ; their edge is entire or very slightly lobed, their extremity sharp-pointed, and their base narrowed and maimed. The texture is somewhat leathery, and the spore masses are disposed sometimes in two close rows and sometimes in one row only.—*Hooker, Species Filicum*, v., p. 9. *Beddome, Ferns of Southern India*, t. 239.



Fig. 65. Creeping Rhizome of Polypodium vacciniifolium (nearly nat. size).

P. u. rubrinerve—rub-rin-er′-vĕ (having red nerves), *Baker.*

Though considered as scarcely more than a variety of *P. urophyllum*, this Fern, native of Aneiteum and the Fiji Islands, is distinct through the dark green colour of its leaflets, naked on both sides, and also through the reddish tint of its midribs.—*Hooker, Synopsis Filicum*, p. 315.

P. (Goniophlebium) vacciniifolium — Go-nĭ-oph-leb′-ĭ-um ; vac-ci-nĭ-if-ol′-ĭ-um (Whortleberry-leaved), *Fischer and Langsdorff.*

Though of small dimensions, this stove Fern, native of the West Indies, Brazil, and St. Catharine Island, is very distinct and interesting. Its stalkless or nearly stalkless fronds (Fig. 65), produced from a slender and very wide-creeping, densely-scaly rhizome, are of two different

forms: the barren ones, roundish or elliptical, are of a dark green colour and very conspicuously veined; the fertile ones are longer, narrower, and strap-shaped. Both kinds are of a leathery texture and quite naked on both sides. The large spore masses are disposed in one series only.—*Hooker*, *Species Filicum*, v., p. 35. *Nicholson*, *Dictionary of Gardening*, iii., p. 194. *Lowe*, *Ferns British and Exotic*, i., t. 41A.

P. (Goniophlebium) vacillans — Go-nĭ-oph-leb′-ĭ-um; vac-il′-lans (wavering). A garden synonym of *P. loriceum latipes*.

P. variabile—var-ĭ-a′-bil-ĕ (variable). A synonym of *P. heteromorphum*.

P. Veitchii—Veitch′-ĭ-i (Veitch's), *Baker*.

A greenhouse species, of small dimensions, native of Japan, with three- or five-lobed fronds in shape of the Greek delta, Δ, and 1in. to 1½in. long. These are produced from a slender, creeping rhizome clothed with pale brown scales, and born on very slender stalks less than 1in. long; they are of a somewhat thin texture, smooth, and of a pale green colour, and their oblong segments, ¼in. to ⅓in. broad, are blunt and minutely notched, the lowest side ones reaching down nearly to the rachis. The sori (spore masses) are globose, large for the size of the plant, and form a single row nearer the midrib than the edge. This species is allied to the Himalayan *P. erythrocarpum*.—*Baker*, *Gardeners' Chronicle*, 1880, p. 494.

P. (Phymatodes) venosum — Phy-mat-o′-dēs; ve-no′-sum (veined). A synonym of *P. lycopodioides*.

P. venulosum—ve-nul-o′-sum (small-veined), *Blume*.

This distinctly-pinnate, stove species, native of Malaysia, much resembles the better-known *P. pectinatum* in habit. Its fronds, cut down to the rachis throughout into close, horizontal leaflets, are 1ft. to 1½ft. long, 1in. to 1½in. broad, and borne on tufted, rigid, wiry stalks 1in. to 3in. long; they are of a somewhat leathery texture, dark green, and naked on both sides. The spore masses are abundant and immersed.—*Hooker*, *Species Filicum*, iv., p. 223.

P. venustum — ven-us′-tum (charming). This is a garden synonym of *P. himalayense*.

P. (Goniophlebium) verrucosum—Go-nĭ-oph-leb′-ĭ-um ; ver-ru-co′-sum (warted), *Wallich.*

A really magnificent, stove species, of large dimensions, native of Malaysia and the Philippine Islands. Its distinctly-pinnate fronds, 3ft. to 4ft. long and 1ft. broad, are borne on firm, erect, naked stalks 1½ft. to 2ft. long, and are of a slender, pendulous habit ; they are furnished with numerous leaflets 6in. to 8in. long, ½in. to ¾in. broad, quite entire, and slightly hairy on both sides. The spore masses, disposed in one regular row on each side of the midrib, are prominent, and, being deeply immersed, form distinct protuberances on the upper surface of the frond.—*Hooker, Species Filicum*, v., p. 31 ; *Garden Ferns*, t. 41. *Nicholson, Dictionary of Gardening*, iii., p. 195. *Lowe, Ferns British and Exotic*, ii., t. 3. *Beddome, Ferns of British India*, t. 257.

P. villosissimum—vil-lo-sis′-sim-um (very hairy), *Hooker.*

This small, greenhouse species, native of Sierra Leone and Fernando Po, is very distinct on account of the very hairy nature of its fronds and the densely scaly nature of the stout, creeping rhizome from which they are produced. The fronds are 6in. to 9in. long, ¾in. to 1½in. broad, and cut down within a short distance of the rachis into close, entire lobes of a leathery texture, densely clothed on their under-side with long, soft, brown hairs. The somewhat tufted stalks on which these fronds are borne, and which measure 2in. to 4in. in length, are also clothed with fine, soft, spreading hairs of the same colour. The sori (spore masses) are disposed in two rows near the midrib.—*Hooker, Species Filicum*, iv., p. 197.

P. (Goniophlebium) villosum—Go-nĭ-oph-leb′-ĭ-um ; vil-lo′-sum (hairy), *Karsten.*

A stove species, of medium dimensions, native of the Andes of New Granada, with spear-shaped, distinctly-pinnate fronds produced from a woody rhizome of a densely scaly nature and about ¼in. thick. These fronds, which are gradually reduced at the base, are 9in. to 12in. long, 2in. to 2½in. broad, and furnished with twenty to thirty pairs of blunt, strap-shaped, entire leaflets barely ¼in. broad and all enlarged at the base. They are of a somewhat leathery texture, and very thick ; their upper surface, of a dull green colour, is nearly naked, and their under-side is densely clothed with

overlapping, spear-shaped, pale brown scales. The spore masses, which are much raised, are disposed in a single row on each side of and close to the midvein. *P.* (*Phegopteris*) *villosum* of Fée is synonymous with *Nephrodium pubescens.*—*Hooker*, *Synopsis Filicum*, p. 512.

P. (Phegopteris) Vogelii—Phe-gop′-ter-is ; Vo-gel′-ĭ-i (Vogel's), *Hooker.*

This beautiful, robust-growing Fern, native of Fernando Po, is very closely related to *P. connexum*, of which it is probably only a variety, with much-divided fronds 4ft. or more in length and 2ft. broad, borne on stalks 1½ft. to 2ft. long and furnished with narrow scales at their base. The most distinctive characters, however, reside in the thicker texture of the leafy portion, and in the larger sori (spore masses).—*Hooker*, *Species Filicum*, iv., p. 271.

P. vulgare—vul-ga′-rĕ (common), *Linnæus.*

Of the five species recognised as native of the British Islands—*P. alpestre*, *P. Dryopteris*, *P. Phegopteris*, *P. Robertianum*, and *P. vulgare*—the last, popularly known as the "Common Polypody," is the only one of an evergreen nature ; it is as highly ornamental in midwinter as at any other time of the year. It is one of the oldest Ferns accepted as truly British, for Dr. William Turner, in the Second Part of his "Herbal," published as far back as 1562, gives, besides its description, a very fair woodcut of *P. vulgare*, which he designates the "Englishe Polypody, the Walle Ferne, or Oke Ferne." Its habitat, however, is far from being limited to the British Islands, where, according to Thomas Moore, in "The Ferns of Great Britain and Ireland," it is stated to occur from the coast-level in the West of England to an elevation of about 2100ft. in the Highlands of Scotland. Moore says : "This common English Fern appears to be also abundant over Europe, extending from the Scandinavian Kingdoms throughout Central and Western Europe to Sardinia, Sicily, Italy, and Corfu on the Mediterranean side, and to Spain and Portugal on the Atlantic side ; whence it extends into Africa by the Azores, Madeira, and the Canary Isles, occurring along the northern shore of the Continent, as at Algiers, and again appearing in South Africa, in the country of the Kafirs. In Asia, it is found in Siberia, and thence eastwards to Kamtschatka, and westwards over the mountains of Western Asia to Erzeroum, but appears wanting on the opposite side of the Continent, there

being no certain information of its occurrence either in China or India. In North-West America it is widely dispersed, being found at Port Mulgrave, Sitka, and the Slave River; thence through Columbia to Canada and the United States on the one hand, and to California, Mexico, and Guatemala on the other."

The Common Polypody is so universally distributed throughout the United Kingdom (where it is found growing naturally on walls, on roofs of cottages, in hedges, on sandy banks, and particularly on old branches of trees), that it is unnecessary to give here a list of its haunts. On account of its importance, however, we cannot refrain from quoting here a very instructive extract from E. J. Lowe's excellent work, "Our Native Ferns" (vol. i., p. 25), which runs as follows: "From the habit of this plant a character is added to the landscape where it grows. A group of pollard Willows clothed with *Polypodium vulgare* are both singular and interesting. The Matlock and Cromford Woods are carpeted over with this species, the rhizomes spreading along the rocks and amongst the moss in the wildest profusion. In higher, more exposed, and consequently more bleak situations, the form becomes compact and the size considerably stunted. A very dwarf variety, scarcely differing from the normal form, occurs along the raised banks of the hedges in the salt districts about Northwich, especially near Wincham, and a similar variety I noticed, subsequently, on Helvellyn and Fairfield, in the Lake District."

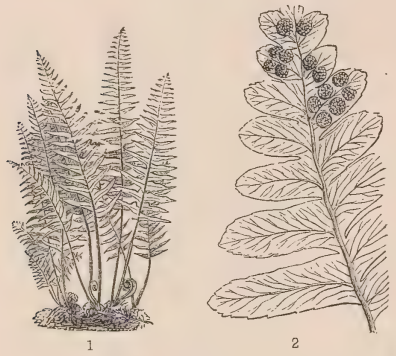


Fig. 66. Polypodium vulgare, showing (1) Habit and (2) Portion of detached Frond
(1, much reduced; 2, ½ nat. size).

Although the dimensions of the fronds of *P. vulgare* are greatly influenced by the situation in which it grows, it may be stated generally that they vary from 6in. to 12in. in length and from 3in. to 6in. in breadth, that they are borne on firm, erect stalks 2in. to 4in. long, and that they are cut down nearly or quite to the rachis into close, entire or slightly toothed, usually blunt leaflets of a soft, papery, or sometimes stiffer texture and naked

on both sides. The sori (spore masses), usually disposed on the upper portion of the fertile fronds, are at first much depressed and hardly noticeable ; but when the fronds approach maturity, they become very attractive through the orange-tawny colour and the shining nature of the little knobs disposed in two regular rows on each leaflet (Fig. 66). *P.* (*Drynaria*) *vulgare* is a synonym of *P. Phymatodes.—Hooker*, *Species Filicum*, v., p. 205 ; *British Ferns*, t. 22. *Nicholson*, *Dictionary of Gardening*, iii., p. 195. *Lowe*, *Our Native Ferns*, i., t. 6 ; *Ferns British and Exotic*, i., t. 38. *Eaton*, *Ferns of North America*, i., t. 31. *Correvon*, *Les Fougères rustiques*, p. 142. *Druery*, *Choice British Ferns*, p. 119.

P. vulgare is found most useful for adorning the hardy rockery, where it proves very effective when growing in a mass, and the ease with which it can be managed, coupled with its evergreen nature, greatly adds to its value as a hardy decorative plant. In the culture of this species it is well to imitate nature as closely as possible. To that effect it is necessary that the spot selected should be shady, cool, and damp, yet without stagnant moisture. The soil which best suits this species is one composed of leaf-mould, or a vegetable compost, interspersed with a cool but not too moist clay or garden mould. Following nature, the rhizomes should not be buried in the ground, but fastened close down to it, the roots alone being covered. Another very important point in connection with the cultivation of the Common Polypody is that it must be planted where its rhizomes can take undisturbed possession of the place selected, as it is only when the plants are well established that they produce really beautiful foliage.

Besides being so highly useful for cultivation out of doors, the Common Polypody and its several varieties are well adapted for the ornamentation of the cool Fernery under glass, where they may be used with great advantage and effect. Nearly every position is adapted to their requirements, although the more elevated parts of the rockwork are preferable, and the shady parts of the Fernery are also more suitable than those which are exposed to strong light.

The only position in which these plants do not thrive is one in which they are continually exposed to the dripping of water, for even occasional thorough dryness at the roots does not cause the immediate destruction of the fronds. In fact, as Mr. Stansfield, who makes a speciality of hardy

British Ferns, and who has most carefully studied their varied wants, truly remarks, "No Ferns are more patient of neglect than the *Polypodium vulgare*, though the cultivator will hardly be tempted to neglect it, or any of its most beautiful varieties, which are perhaps the freest-growing. They all particularly delight in the decaying trunks of old trees, so that in forming a rockery, either in or out of doors, it is well to introduce some old stumps for the purpose of fixing the rhizomes upon them, and filling the crevices with a compost of fibrous peat, leaf-mould, and silver sand. In order to help the establishing of the Ferns, which should be planted in close proximity to some decaying wood, they should be securely fastened to the ground with wooden pins in the first instance, taking care that the spot where they are planted be thoroughly drained. In the greenhouse they also thrive equally well in shallow pots or pans filled with the same compost, provided that these be well drained."

P. vulgare and its varieties are usually propagated by division, which may be done at almost any time of the year, though spring is the most suitable season.

The Common Polypody is given to variation to such an extent that in Mr. P. Neill Fraser's list, published in 1865, over sixty forms are enumerated, some of which, it is to be feared and regretted, have now completely disappeared from collections. Some of the varieties differ from the species only through the crested character of the fronds, which in most cases attain a greater development than those of the typical plant; other varieties are rendered more or less distinct by the notched nature of their leaflets or by the plumose appearance of their fronds; while others, on account of their fronds becoming decompound (much divided), are so unlike those of the typical plant as to require the knowledge of the botanist to point out that all these widely-different forms are really related to *P. vulgare*. The most distinct varieties are here described:

P. v. acutum—ac-u′-tum (sharp-pointed), *Moore*.

This variety, originally found at Hartley Mandit, near Alton, Hants, and subsequently on rocks in North Wales, in the meadows near Malden and Ewell, Surrey, and in Cobham Park, Kent, differs from the normal species only in the tips of the leaflets tapering into a long, sharp point. When in its

perfect character it forms a very elegant Fern.—*Lowe*, *Our Native Ferns*, i., fig. 7. *Moore*, *Nature-printed British Ferns.*

P. v. a. Stansfieldii—Stans-field′-ĭ-i (Stansfield's), *Lowe.*

This broad-fronded variety, with long, narrow, acutely-pointed leaflets, is distinct from the one just described and much handsomer. According to E. J. Lowe, it was originally discovered near Cark, in Lancashire, by Mr. Stansfield, and subsequently near Settle and near Milnthorpe by other collectors.—*Lowe*, *Our Native Ferns*, i., t. 9.

P. v. attenuatum—at-ten-ŭ-a′-tum (diminished), *Wollaston.*

In this variety the fronds are large and provided with narrow and much-attenuated leaflets; these are distantly placed, alternate (not opposite), slender, and of a thin texture.—*Lowe*, *Our Native Ferns*, i., fig. 10.

P. v. aurito-dentatum — au-ri′-to-den-ta′-tum (eared and toothed), *Monkman.*

The fronds of this singular variety, originally found growing upon a wall near Lake Windermere, are normal in outline and provided with leaflets strongly eared next the rachis and deeply toothed on their inferior margin. It is a pretty Fern, of constant characters.—*Lowe*, *Our Native Ferns*, i., fig. 8.

P. v. auritum—au-ri′-tum (eared), *Moore.*

This variety is readily distinguished by the ear-like appendage or leafit attached, sometimes to the anterior, and at other times to the posterior, base of the leaflets of its fronds, which are normal in outline. It seems to have occurred simultaneously in various places, as, according to Lowe, it was gathered near Windermere, near Settle, at Heldenley, near Malton, Fountain's Abbey, Keswick, and Bowness, and in North Wales.—*Lowe*, *Our Native Ferns*, i., fig. 9. *Nicholson*, *Dictionary of Gardening*, iii., p. 195.

P. v. bifido-cristatum—bif′-id-o-cris-ta′-tum (twice-cleft and crested), *Moore?*

Druery, in his excellent work "Choice British Ferns," states that this is a long, narrow, robust, crested form; its short leaflets are fanned out at the tips into rounded crests, and the frond-tip, repeatedly divided, forms a large, flat tassel.—*Druery*, *Choice British Ferns*, p. 120.

P. v. bifidum—bif′-id-um (forked), *Moore.*

A distinct and good variety, which has been found in various parts of the Lake District, in Wales, on the Yorkshire Hills, at Arnside, near Milnthorpe, in the Valley of the Conway, at Matlock, near Ambleside, at Chaigeley Manor, near Clitheroe, &c. Its leaflets are variously forked, occasionally three or four times cleft, sometimes almost branching and developing into *P. v. ramosum.* Unfortunately, this variety is not of a very constant nature, as Lowe states, in "Ferns British and Exotic" (vol. i., p. 113), that several beautiful plants of it which he collected at Matlock lost nearly all their bifid character either under pot-culture or when planted in the open Fernery. He adds that in 1853 in a wood near Cromford, Derbyshire, he came upon a patch half-a-dozen yards square of *P. v. bifidum*, the fronds of which were divided almost to the apex.—*Lowe*, *Our Native Ferns*, i., fig. 12; *Ferns British and Exotic*, i., p. 113. *Moore*, *Nature-printed British Ferns.* *Nicholson*, *Dictionary of Gardening*, iii., p. 195.

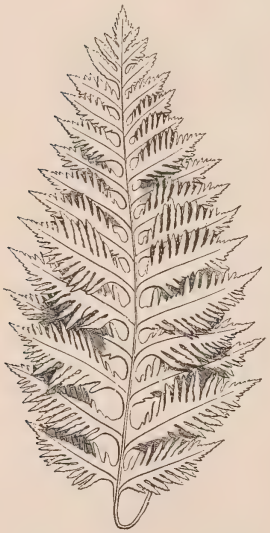


Fig. 67. Frond of Polypodium vulgare cambricum (¼ nat. size).

P. v. cambricum — cam′-bric-um (Welsh), *Linnæus.*

This may be considered, not only as the most distinct form of Polypody, but also as one of the most beautiful Ferns in cultivation. It is the true plumose form of the species, is of a dense and very pleasing habit, and is constantly barren. Its beautiful fronds (Fig. 67), which are much thinner and more delicate in texture than those of the normal plant, attain sometimes 1½ft. in length and often measure 5in. in breadth. Through their divisions being broadly toothed next to the midrib and divided into strap-shaped segments, these fronds, which are broadly egg-shaped, are rendered particularly plumose by the overlapping of the divisions, which gives the plant a particularly leafy appearance so thoroughly different from anything else in cultivation, that it seems more like a distinct species than a mere variety. —*Lowe*, *Our Native Ferns*, i., fig. 13. *Moore*, *Nature-printed British Ferns.*

Nicholson, *Dictionary of Gardening*, iii., p. 195. *Druery*, *Choice British Ferns*, p. 120.

The Welsh Polypody is no new or modern form, for it was known as a British variety as far back as 1686, when we find it mentioned in the "Historia Plantarum" of Ray, who says that he received it from Sir Hans Sloane, and that it was first discovered near Dennis Powis Castle, near Cardiff. Since then it has been gathered in various places, notably at Chepstow, in Monmouthshire, near Dundry Church, in the neighbourhood of Bristol, and also at Braid Hall, near Edinburgh; and Moore, in his "Nature-printed Ferns," states that he has received it from Mr. E. J. Lowe, who found it in a wood near Macclesfield, and that Mr. E. T. Bennett also sent him specimens from the neighbourhood of Ross, in Herefordshire, which were almost identical in structure with the Welsh plant. On account of its thoroughly sterile character, it is difficult to imagine how this beautiful Fern has managed to spread to localities so far apart; for, although it has always proved constant under cultivation like other plumose forms of Ferns, it has never been known to produce any fertile fronds either in cultivation or in a wild state.

Although quite hardy, *P. v. cambricum* makes a splendid pot plant when grown in the cold frame or in the greenhouse, the pleasing pale green colour of its foliage being particularly attractive among other Ferns.

P. v. coriaceo-bifidum — cor-ĭ-a′-cĕ-o–bif′-id-um (leathery and forked), *Monkman*.

This variety, originally discovered at Low Hutton, near Malton, is a short-fronded, upright-growing plant of a remarkably leathery texture. The leaflets, particularly the lower pairs, are forked (as is also the frond occasionally), and their margins are frequently saw-toothed. The fructification is particularly large, the spore masses almost joining, and in the autumn the vivid yellow colour of the spore masses gives the whole plant quite a golden appearance. Mr. Monkman, who, in 1857 or 1858, found this variety growing on a dry wall, states that, though quite constant in a wild state, it is not so permanently bifid as could be desired under cultivation *until well established*, having been left undisturbed at the roots. He therefore advises plunging the pot, when full, into a larger one rather than repotting the plant when apparently needed.—*Lowe*, *Our Native Ferns*, i., fig. 15.

P. v. cornubiense—cor-nu-bĭ-en′-sĕ (Cornish), *Moore.*

Referring to this beautiful variety, which he describes at great length in the "Gardeners' Chronicle," Moore says that it was found many years ago in Cornwall, and has received more than one name, but that the present one is adopted as it is significative of the habitat, just as *P. v. cambricum* is for the "Welsh Polypody." It has also been called *P. v. Whytei*, having been gathered by the Rev. Mr. Whyte, and *P. v. elegantissimum*, being very elegant in outline. It is a remarkable form, in which scarcely any traces of the typical plant are left; indeed, were it not for occasional fronds reverting sometimes entirely and sometimes partially to the type, it would be difficult to discern that the two plants are related to each other; but the production of these fronds is conclusive proof of the specific and varietal relationship. By the uncommon nature of its finely-divided fronds, which, however, are not transparent and rarely exceed 10in. in length, this variety resembles the well-known "Killarney Fern" (*Trichomanes radicans*), or, as Moore says, "it has much more the appearance of an exotic Davallia than that of the wild Polypody of our hedgerows and pollard trees." Although exquisitely delicate in appearance, it is nevertheless a free grower and one of the most distinct Ferns known. It reproduces itself very freely from spores, most of the young seedlings retaining the finely-divided character of the parent.—*Moore, Gardeners' Chronicle*, 1876, p. 465.

P. v. crenatum—cre-na′-tum (notched), *Moore.*

This variety, gathered near Ruthin, at Conway Castle, at Saltwood, also at Muckross, in Ireland, and on the Carberry Island, near Athlone, has broad, egg-shaped fronds much larger and of a much thinner texture than those of the typical species. The margins of the leaflets are notched and sometimes undulated, and the spore masses are sometimes oblong.—*Lowe, Our Native Ferns*, i., fig. 16. *Moore, Nature-printed British Ferns.*

P. v. cristatum—cris-ta′-tum (crested), *Moore.*

In this distinct and beautiful variety, of Irish origin, the points of each frond are branched and crested, and all its leaflets terminate in small, crested tufts, so as to form a frilled margin all around the fronds, which are 6in. to 9in. long. The large and prominent spore masses cover the whole under-side

of the upper half of the frond quite to the extremity, where it is more or less branched.—*Lowe*, *Our Native Ferns*, i., t. 7A; *New and Rare Ferns*, t. 26B. *Nicholson*, *Dictionary of Gardening*, iii., p. 195.

P. v. dentatum—den-ta′-tum (toothed), *Monkman*.

This extremely handsome, large-growing variety, whose fronds often attain 1½ft. in length and 8in. or 9in. in breadth, was originally found growing upon a bridge in the grounds of Fountains Abbey, Ripon, Yorkshire. In general outline it somewhat resembles *P. v. acutum*, but when well established has its leaflets, especially the lower ones, very deeply toothed and sometimes forked. —*Lowe*, *Our Native Ferns*, i., fig. 17.

P. v. denticulatum—den-tic-ul-a′-tum (small-toothed), *Moore*.

A variety with fronds of normal size and shape, but with leaflets showing small teeth on their margins. It has been found near Hereford, and near Hutton Railway Bridge, in the neighbourhood of Malton; and, according to Moore, a very similar plant is also found in Portugal and in North America.—*Lowe*, *Our Native Ferns*, i., fig. 18. *Moore*, *Nature-printed British Ferns*.

P. v. elegantissimum—e-leg-an-tis′-sim-um (most elegant), *Moore*.



Fig. 68. Polypodium vulgare elegantissimum (½ nat. size).

This variety (Fig. 68), though closely related to *P. v. cornubiense*, is quite distinct from that form, its fronds being broader and much more finely divided. It also produces now and again some fronds partly like the species and partly compound, but very seldom reverts to the type, like *P. v. cornubiense* does. The name *elegantissimum* is also applied to *cornubiense*.—*Nicholson*, *Dictionary of Gardening*, iii., p. 195. *Druery*, *Choice British Ferns*, p. 120.

P. v. falcatum—fal-ca′-tum (sickle-shaped), *Kellogg.*

In this variety, which, according to Eaton, is found growing sometimes on trees and sometimes in crevices of rocks in Shoalwater Bay, Washington Territory, and near Port Orford, Oregon, the leaflets, very gradually narrowed to an acute point, are finely toothed. Eaton states ("Ferns of North America," vol. i., p. 202) that "the fronds are ample, about 1ft. long, and broader in the middle than at the base," and that "they are much thinner in texture than those of *P. vulgare*, to which Baker has referred the plant."—*Eaton*, *Ferns of North America*, i., t. 26. *Hooker*, *Synopsis Filicum*, p. 334.

P. v. grandiceps—gran′-dic-eps (large-headed). A synonym of *P. v. multifido-cristatum.*

P. v. hibernicum—hib-er′-nic-um (Irish). Synonymous with *P. v. semilacerum.*

P. v. interruptum—in-ter-rup′-tum (interrupted), *Moore.*

This variety, more curious than beautiful, was originally discovered at Tunbridge Wells. Its fronds are of normal shape and ordinary dimensions, but some of the leaflets in their lower half are found either totally wanting or maimed in such a way as to be occasionally forked or curiously cleft.—*Lowe*, *Our Native Ferns*, i., fig. 19. *Moore*, *Nature-printed British Ferns.*

P. v. lobatum—lob-a′-tum (lobed), *Sidebotham.*

The fronds of this handsome variety have their lower leaflets large and distinctly eared on their upper edge next the rachis and notched, and the spore masses are of a particularly small size. It was originally found near Ambleside, and later on near Bowness and near Beddgelert, in North Wales. —*Lowe*, *Our Native Ferns*, i., fig. 20.

P. v. marginatum—mar-gin-a′-tum (edged), *Moore.*

This form of variation, though frequent in *Scolopendrium*, is very rarely met with in other genera; its peculiarity consists in the splitting of the epidermis on the margins of the lobes and in its receding, generally on the

under-side of the frond, towards the midvein. The present form was found simultaneously in Kent and at Windermere. Sometimes its leaflets, which

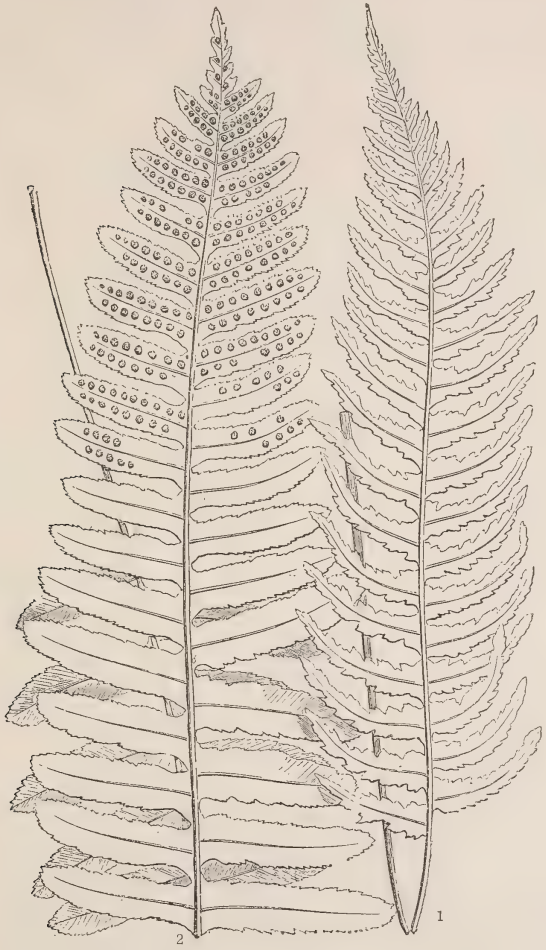


Fig. 69. Polypodium vulgare vars. (1) marginatum and (2) truncatum (½ nat. size).

are conspicuously saw-toothed (Fig. 69), are also eared at the base.—*Lowe*, *Our Native Ferns*, i., fig. 22 ; *New and Rare Ferns*, p. 65. *Moore*, *Nature-printed British Ferns*. *Nicholson*, *Dictionary of Gardening*, iii., p. 195.

P. v. multifido-cristatum — mul-tif′-id-o–cris-ta′-tum (much cleft and crested), *Moore*.

This splendid variety, also found in gardens under the name of *grandiceps*, is totally distinct from any other form of Polypody. Its marked feature resides in its repeatedly short and leafy forkings, each alternate one crispy, the whole forming a handsome, dense, flattish or circular crest or tassel, produced at the expense of the leaflets, which are comparatively few.—*Lowe*, *Our Native Ferns*, i., fig. 25. *Nicholson*, *Dictionary of Gardening*, iii., p. 195. *Druery*, *Choice British Ferns*, p. 122.

P. v. multiforme—mul-tif-or′-mĕ (of many forms), *Moore*.

A very large-growing variety, with long-stalked fronds, which are broad, divided and lobed somewhat like the better-known *semilacerum*, but differing from that variety in being irregular and in having a horn-like projection of the midrib of many of the abruptly-ending leaflets, which are deeply notched, such fronds appearing as if the upper part had been suddenly stopped in growth or broken out. This variety is extremely variable in size and form; it was originally found at Windermere, and subsequently in County Cork, and in Wass Woods, near Coxwold, Yorkshire.—*Lowe*, *Our Native Ferns*, i., fig. 26.

P. v. obtusum—ob-tu′-sum (blunt), *Stansfield*.

A pretty, small-fronded variety, found simultaneously in North Wales and in Devonshire. It is distinguished by the rounded edges of the leaflets, which are very blunt.—*Lowe*, *Our Native Ferns*, i., fig. 27.

P. v. omnilacerum—om-nil-ac′-er-um (wholly torn), *Moore*.

This very elegant and distinct variety, originally found near Goodrich Castle, Ross, Herefordshire, is somewhat like *P. v. cambricum*, from which, however, it essentially differs in being at all times fertile. It is nearly upright in habit, and its fronds, 1ft. to 1½ft. long, are provided with leaflets narrowish at the base, widening towards the middle, and tapering beyond. These leaflets are deeply cut into rather narrow, often much attenuated, sharp lobes, which, towards the centre of the leaflets, are often much jagged, particularly from the lower margin. Usually the fronds are considerably longer than those of *P. v. cambricum*, the leaflets having their

divisions more acute and more regular than those of that variety. This form is constant under cultivation. While young, the leaflets are sharply and deeply toothed—exceedingly saw-edge-like: when stronger, these teeth lengthen into slender lobes, which are again a little torn, or toothed.—*Lowe*, *Our Native Ferns*, i., t. 7B. *Druery*, *Choice British Ferns*, p. 122. *Nicholson*, *Dictionary of Gardening*, iii., p. 195.

P. v. ovatum—o-va′-tum (egg-shaped), *Moore.*

Originally discovered at Ballyvaghan, in the West of Ireland, and found to be common in Madeira and the Azores, this variety is allied to *P. v. denticulatum;* the fronds, however, vary in size, are egg-shaped rather than oblong, and are also of a much more leathery texture, with leaflets more obscurely toothed, the lowest being horizontal, and the upper ones decreasing in size.—*Moore*, *Nature-printed British Ferns*. *Lowe*, *Our Native Ferns*, i., p. 46.

P. v. pulcherrimum—pul-cher′-rim-um (very beautiful), *Moore.*

In this variety, which was originally found near Milnthorpe, we have a truly handsome and distinct Fern, equal in beauty to, if not even surpassing, *P. v. omnilacerum* and *P. v. cambricum.* It may indeed be considered as intermediate between these two lovely varieties, showing to a great extent the beautiful bipinnatifid character of the latter; but its fronds seldom attain more than 1ft. in length, though they possess the same divisions of the leaflets and the imbricated pinnules (overlapping leafits). On the other hand, instead of being constantly barren, they are abundantly fertile, like those of *P. v. omnilacerum*, and, also like them, are of a thicker and much firmer texture than those of the "Welsh Polypody." It may also be remarked that the leaflets and leafits are blunt and rounded at their extremity, instead of being sharp-pointed like those of *P. v. omnilacerum.*—*Lowe*, *Our Native Ferns*, i., fig. 28.

P. v. ramosum—ra-mo′-sum (branched), *Moore.*

This may be described as a more developed form of *P. v. bifidum*, frequently branched in the stalk of the leafy portion, and again divided. It is furnished with variously-bifid leaflets, which, when the process of forking

is carried far enough, frequently form wide crests of a peculiarly flat nature. —*Lowe, Our Native Ferns*, i., fig. 29. *Moore, Nature-printed British Ferns. Druery, Choice British Ferns*, p. 122.

P. v. semilacerum—se-mil-ac′-er-um (half-torn), *Link.*

This is the *P. v. hibernicum*, or "Irish Polypody," of Moore, and the most compound of all the permanent *fertile* forms of the species known in cultivation. It is also called the "Dargle Fern," having originally been found near the Dargle Valley, Wicklow, where the fronds are well marked, and at Killarney. Its habitat is not, however, limited to Ireland, for Lowe states that it has also been found in a wild state in Devonshire, Norfolk, Kent, Monmouth, and Carnarvonshire, as well as on the Carberry Island in Lough Ree, near Athlone. Though not characteristic until it has attained a good size, this is an exceedingly handsome Fern, and quite constant under cultivation. Its long-stalked and nearly upright fronds, 1ft. to 1½ft. in length and 6in. in breadth, are very deeply bipinnatifid in their lower part, and become fertile and pinnatifid towards their summit, the fructification being bold and prominent. The under-side of the frond is of a pale green or somewhat glaucous colour, and the leafits, or lobes, are narrow, sharp-pointed, and saw-toothed.—*Lowe, Our Native Ferns*, i., t. 8. *Moore, Nature-printed British Ferns. Nicholson, Dictionary of Gardening*, iii., p. 195.

P. v. serratum—ser-ra′-tum (saw-toothed), *Moore.*

In the most typical state of this form, which is somewhat variable, the leaflets are deeply serrated. The fronds are large—more than 1ft. long and from 4in. to 6in. broad. When well grown it approaches *P. v. semilacerum* in form, and sometimes, having rounded, enlarged teeth, it also approaches *P. v. crenatum.* This variety has been found in Guernsey, at Milnthorpe, Conway, Fountains Abbey, Byland Abbey, Bowness, Lancaster, in Westmoreland, &c.—*Lowe, Our Native Ferns*, i., fig. 30. *Moore, Nature-printed British Ferns.*

P. v. serrulato-bifidum — ser-rul-a′-to-bif′-id-um (small-toothed and forked), *Monkman.*

This handsome form, originally found at High Hutton, near Malton, is, like most of the bifid forms, somewhat inconstant in cultivation. Its long,

narrow fronds have their lower leaflets pretty uniformly divided, and all are finely toothed, especially towards the summit.—*Lowe*, *Our Native Ferns*, i., fig. 31.

P. v. serrulatum—ser-rul-a′-tum (small-toothed), *Moore*.

A dwarf variety, with fronds of normal outline. It was simultaneously found in Devonshire and near Malton, growing on trunks of trees. It is distinguished by the teeth of the leaflets being very minute.—*Lowe*, *Our Native Ferns*, i., fig. 32. *Moore*, *Nature-printed British Ferns*.

P. v. sinuatum—sin-u-a′-tum (waved), *Moore*.

This variety, originally found at Tunbridge Wells, is allied to *P. v. interruptum*. Its fronds are short and broad, and the leaflets, long and undulated at their edges, are rarely ever divided at their summit.—*Lowe*, *Our Native Ferns*, i., fig. 33. *Moore*, *Nature-printed British Ferns*.

P. v. s. Monkmanii—Monk-man′-ĭ-i (Monkman's), *Moore*.

A very dwarf-growing and extremely variable form, originally found at Hest Bank, Morecambe Bay. Its fronds vary as widely as possible in general appearance, being depauperated, multifid, laciniated, interrupted, and in other respects very irregular. The leaflets are often much shortened, forked, notched, cleft, and occasionally united throughout, sometimes totally wanting.—*Lowe*, *Our Native Ferns*, i., fig. 34.

P. v. trichomanoides—trich-om′-an-ŏ-i′-des (Trichomanes-like), *Moore*.

This variety, whose origin is practically unknown, though it is supposed to be a break from *P. v. cornubiense*, is undoubtedly the most beautiful of its section. All that is known about its first appearance is that it was brought from the South of England by Messrs. J. Backhouse and Sons, who distributed it about 1873. Its beautiful fronds, 1ft. or more in length, are of a slightly arching habit; they are highly compound, every leafit being so divided and lacerated that, instead of the usual flat surface, the frond is converted into a plumose mass of most delicate and charming appearance.—*R. Potter*, *Gardeners' Chronicle*, 1884, p. 435. *Druery*, *Choice British Ferns*, p. 121.

P. v. truncatum—trun-ca′-tum (maimed), *Moore.*

In this variety, which was found simultaneously in Ireland and near Windermere, the fronds attain 1ft. or more in length. They are sometimes maimed, the leafy portions wanting and the veins projecting, forming irregular points. The leaflets, of normal dimensions, are finely saw-toothed (Fig. 69, p. 243).—*Lowe, Our Native Ferns*, i., fig. 21. *Moore, Nature-printed British Ferns.*

P. v. Whytei—Why′-tĕ-i (Whyte's). Another name for *P. v. cornubiense.*

We have described above all the handsomest forms of the Common Polypody. There are others which are cultivated especially on account of their strange appearance. Among these are the following: *P. v. glomeratum*, of Mullins, which C. T. Druery terms an oddity, every frond and division branching repeatedly anyhow, no two being alike. *P. v. cambricum Prestonii*, of Preston, is a sub-variety of smaller dimensions and of a still more plumose character than the Welsh Polypody, from which it is issue. *P. v. variegatum*, of Stansfield, found simultaneously at Oldstead, Yorkshire, and near Cark, Lancashire, is another curiosity. The fronds are much like those of *P. v. acutum*, from which it is distinguished only by the variegation, being distinctly striped with yellowish-white. In some instances, instead of being striped, the fronds are marbled above with yellow blotches. Unfortunately, when the plant grows vigorously, the variegation is not very constant, but, when in character, it is very pretty. Equally curious and interesting is *P. v. suprasoriferum*, of Wollaston, a plant which he found near Woolbeding, Sussex. Its narrow-spear-shaped fronds, furnished with toothed and somewhat auricled (eared) leaflets, are rendered very interesting through the unique disposition of their fructification. When barren, its fronds appear nearly normal, though the leaflets are disposed farther apart than those of the typical plant: when fertile, however, they have a particularly strange aspect, on account of the sori (spore masses) being in many instances disposed along the margins of the upper surface of its very narrow fronds. *P. v. Thompsonii*, of Monkman, is an erect-growing form of dwarf habit, with leaflets nearly, and in some instances quite, overlapping; this was found at Mulgrave Woods, near Whitby. But the most curious of all the known varieties of the Common Polypody is undoubtedly *P. v. compositum*, of Wollaston, a form



Pellæa geraniæfolia

(nearly nat. size).

found simultaneously near Nettlecombe and near Windermere; it apparently embodies all the different variations shown by other forms. As a truly composite sport it is particularly interesting, some of its fronds, which reach 1½ft. long, being, like those of *P. v. ramosum*, branched for two-thirds of their stalks; others are partly forked, as in the variety *bifidum*, and partly serrated, as in the forms *serratum* and *omnilacerum;* while others again are either much enlarged and plumose, like those of *cambricum* and *semilacerum*, or sometimes eared, like those of *auritum*.

P. Wageneri—Wa′-gen-er-i (Wagener's). Synonymous with *P. pectinatum*.

P. (Dipteris) Wallichii—Dip′-ter-is; Wal-lich′-ĭ-ī (Wallich's), *R. Brown*.

This is a very singular and thoroughly distinct, stove species, native of the sub-tropical region of Northern India, and said by Beddome to occur in Khasya, Bhotan, and Assam, and on the Pundoa Mountains. Its curious fronds, in two distinct halves, borne on stalks 2ft. to 3ft. long, are 1ft. to 3ft. in length and much broader; the main lobes reach three-quarters of the way down, and have their edges not at all toothed, while their ultimate lobes are sharp-pointed. These fronds are of a leathery texture, dark green on their upper surface, and dirty-white or light rusty colour beneath; their main veins, which are very prominent, are repeatedly forked, and the small and abundant spore masses are generally disposed in distinct rows, not confluent, but equally distributed over the surface, and often of a gummy nature.—*Hooker*, *Species Filicum*, v., p. 99. *Beddome*, *Ferns of British India*, t. 80.

P. (Drynaria) Willdenovii—Dryn-a′-rĭ-a; Will-den-o′-vĭ-i (Willdenow's), *Bory*.

A handsome, stove species, native of Mauritius and Bourbon Island; it must not be confounded with *P. Willdenovii* of Blume, which is synonymous with *P. propinquum*. It is a plant with barren and fertile fronds totally different: both kinds are produced from a thick rhizome of a woody nature, clothed with narrow, crisped scales about ½in. long and of a bright rusty-brown colour, and are of a leathery texture. The barren fronds, 4in. to 6in. long and 3in. to 4in. broad, have their lobes short, blunt, and rounded; the fertile ones, 1½ft. to 2ft. long and 6in. to 10in. broad, have their upper lobes 4in. to 5in. long, narrow, sharp-pointed, and reaching down to the rachis, the

lower ones shorter and blunt, with a narrow wing running down the stem to the base. The spore masses, slightly immersed, are disposed in one row on each side of the midvein. When dry the fronds emit a very pleasing almond odour.—*Hooker*, *Species Filicum*, v., p. 97. *Nicholson*, *Dictionary of Gardening*, iii., p. 195.

P. (Phegopteris) Wrightii—Phe-gop′-ter-is ; Wright′-ĭ-i (Wright's), *Baker*.

This stove species, of small dimensions, produces from an upright-growing rootstock of a woody nature its spear-shaped, simply-pinnate fronds, which are 6in. to 9in. long, and borne on tufted grey stalks of similar length. The stalked leaflets are square and eared on the upper side, wedge-shaped and maimed on the lower side at the base ; they are of a rigidly leathery texture, dull green in colour, and naked on both sides. The sori (spore masses) are disposed in a single row not far from the edge of the leaflets.—*Hooker*, *Synopsis Filicum*, p. 304.

P. Xiphias—Xiph′-ĭ-as (swordfish), *Moore*.

The specific name of this very curious stove Fern refers to the peculiar shape of its fronds, which in outline resemble the figure of the swordfish. It is a native of the South Pacific Islands. The plant is provided with a wide-creeping rhizome, about as thick as a goose-quill, and clothed with brownish scales, from which the fronds, 1ft. or more long, 4in. across in their widest part, and terminating in a tail-like appendage about 2in. long, are produced. The fronds gradually narrow downwards, with a slight wing extending to the very base, being elliptic-oblong in shape, of a firm though not leathery texture, and somewhat undulated at the edge. The tail-appendage and about one-third of the base of the frond are barren, but the rest of the under-surface is copiously and pretty equally dotted over with medium-sized, round sori (spore masses), which, though apparently irregularly disposed, in reality form thinly-furnished lines, four in number, between the main veins, the lines becoming lost towards the margin of the frond.—*Moore*, *Gardeners' Chronicle*, 1881, p. 331. *Nicholson*, *Dictionary of Gardening*, iv., p. 592.

P. zeylanicum—zey-lan′-ic-um (Cingalese), *Mettenius*.

A stove species, of medium dimensions, native of Ceylon, provided with a strong, wide-creeping rhizome clothed with broad, grey scales. Its entire

(undivided) fronds, borne on stalks 1in. or more in length, clothed with soft, spreading hairs, are 8in. to 12in. long, ¼in. broad, sharp-pointed at their summit, but very gradually narrowed to the base, and slightly waved along the edges; they are of a leathery texture and naked on both sides. The spore masses are disposed in long rows midway between the midrib and the edge.—*Hooker*, *Species Filicum*, iv., p. 169, t. 272B. *Beddome*, *Ferns of Southern India*, t. 237.

P. Zollingerianum—Zol-lin-ger-ĭ-a′-num (Zollinger's). Synonymous with *P. heterocarpum.*



Fig. 70. Polypodium zosteræforme
(½ nat. size).

P. (Phymatodes) zosteræforme — Phy-mat-o′-dēs; zo-ste′-ræ-for′-mĕ (riband-shaped), *Wallich.*

This singular-looking, stove species, of small dimensions, is a native of Tenasserim, Burmah, and Moulmein. Its riband-like fronds, 4in. to 6in. long, very narrow, with edge entire, and gradually narrowed to the base, are produced from a wide-creeping, slender rhizome of a fragile nature and scaleless; they are borne on very slender short stalks (Fig. 70, reduced from Col. Beddome's

"Ferns of British India," by the kind permission of the author); their texture is soft and papery, and their colour dark green. The spore masses are disposed in irregular rows between the midvein and the margin.—*Hooker*, *Species Filicum*, iv., p. 64. *Beddome*, *Ferns of British India*, t. 123.

POLYSTICHUM—Pol-ys′-tich-um. *See* **Aspidium.**

PROFEREA—Prof-er′-ĕ-a. *See* **Nephrodium.**

PROSAPTIA—Pros-ap′-tĭ-a. *See* **Davallia.**

PSEUDATHYRIUM—Pseud-ath-yr′-ĭ-um. *See* **Polypodium.**

CHAPTER XI.

PTERIS, *Linnæus.*

(Ptĕr′-is.)

Bracken or Brake.

THE genus *Pteris* (the old Greek name for a Fern, used by Dioscorides, and derived from *pteron*, a feather, probably in allusion to the shape of the fronds) is large and cosmopolitan, comprising, besides the hardy British species *P. aquilina* and its varieties, numerous stove and greenhouse exotic species exhibiting very extensive variation as regards size, texture, and cutting of the fronds, as well as modes of growth, and including plants of almost every kind of division and venation.

Though there are no species of *Pteris* with entire (undivided) fronds known, those with fronds simply pinnate (only once divided to the midrib), and those with the lower leaflets slightly pinnate below, with a long, narrow terminal point, are abundant and show great variation in the dimensions and texture of their foliage. The most striking, as also some of the best-known species belonging to these groups, are *P. cretica*, *P. longifolia*, and *P. serrulata*, all of which are of medium dimensions only. Yet in *P. moluccana* and *P. litobrochioides* we have two gigantic-growing plants with foliage of the same description. There are also species with fronds twice or three times divided to the rachis, such as *P. quadriaurita* and *P. tremula;* these are strong-growing kinds forming a striking contrast with the comparatively small plants belonging to the *Doryopteris* section, in which the fronds are of very

peculiar forms and of a leathery texture, as may be readily judged from *P.* (*Doryopteris*) *palmata* and *P. sagittifolia.*

Whatever their dimensions, the above-named plants have their fronds produced from either single or tufted crowns; but there are other species in which the fronds are produced from and disposed along a creeping rhizome. Foremost among the strongest growers of these are *P. aquilina* (our common Bracken) and *P. incisa*, while among the smaller-growing species *P. scaberula* may be named as one of the most distinct. If we compare the gigantic drooping *P. moluccana* and the equally strong-growing but upright *P. tremula* with such species as *P. pedata* and *P. sagittifolia*, the fronds of which seldom attain more than 9in. in length, we at once realise a striking contrast, in shape as well as in dimensions.

Pteris, in Hooker and Baker's "Synopsis Filicum," is Genus 31, and forms an important portion of tribe *Pterideæ.* Its distinguishing characters reside in the disposition of the sori (spore masses), which are marginal (attached to the edge of the leaflets or of the leafits), and disposed in a narrow, continuous line, occupying a slender, filiform (thread-like) receptacle in the axis of the involucre, which is of the same shape as the spore masses and usually of a parchment-like texture. This involucre, which at first quite covers the spore masses, eventually becomes more or less spreading as ripening proceeds. In some species the veins are free, while in others they are more or less anastomosing (intercrossing each other), and it is principally on these latter characters that the genus has been subdivided into the following sections :

Amphiblestra (Am-phib-le′-stra), *Presl.* This sub-genus, which, up to the present, comprises but one species, has veins copiously intercrossing each other and free veinlets.

Campteria (Camp-te′-rĭ-a), *Presl.* A sub-genus composed of a few strong-growing species with veins all free, except that those of the last divisions but one are more or less connected by arching veins at the very base.

Doryopteris (Dor-ў-op′-ter-is), *J. Smith.* In this sub-genus, of thoroughly distinct outward appearance, the fronds are small, sagittate (arrow-shaped), or sub-pedate (their subordinate parts having a palmate arrangement), and borne on distinct footstalks. The veins copiously intercross each other, and they have no free veinlets.

Eupteris (Eup′-ter-is), or true Pteris, *Linnæus.* This sub-genus is the most extensive of the whole genus, and embraces: Plants with simply-pinnate fronds (*e.g.*, *P. longifolia*); plants having their lower leaflets forked or slightly pinnate below, with a long, narrow, entire terminal leaflet (*e.g.*, *P. serrulata*); plants with their lowest leaflets again pinnate (*e.g.*, *P. mutilata*); plants with their lowest leaflets at least bipinnatifid, or twice divided nearly to the midrib (*e.g.*, *P. quadriaurita*); and plants with their lowest leaflets much larger than the others, often nearly equalling the central portion of the frond (*e.g.*, *P. longipes*). The species in this sub-genus have all their veins free.

Heterophlebium (Het-er-oph-leb′-ĭ-um), *Fée.* The few plants comprised in this sub-genus have their veins free below, but intercrossing each other towards the margin.

Litobrochia (Li-tob-roch′-ĭ-a), *Presl.* This somewhat extensive sub-genus is composed of plants having the same habit as *Eupteris*, but with veins copiously intercrossing each other and without free veinlets.

Pæsia (Pæs′-ĭ-a), *St. Hilaire.* According to strict technical characters, this sub-genus, also known as *Ornithopteris* of Agardh, which differs from the rest of the genus in habit of growth, has as good a claim to be placed in *Lindsayæ* as *Pterideæ*. The fronds are produced from a creeping rhizome, upon which they are distantly placed; their veins are free, and they are furnished with an involucre of a more or less distinctly double nature.

The geographical distribution of the genus *Pteris* is as extensive as that of any other, these useful plants being found in many parts of the Old and New Worlds alike. While Europe produces such popular species as *P. aquilina*, *P. arguta*, *P. cretica*, and *P. longifolia*, Tropical America supplies us with *P. chilensis*, *P. coriacea*, *P. laciniata*, *P. palmata*, *P. pulchra*, *P. sagittifolia*, &c. Again, we have in *P. macilenta*, *P. scaberula*, and *P. tremula* three most distinct plants native of New Zealand, though the last-named is also found wild in Australia and in company with the equally distinct and no less beautiful *P. incisa* and *P. umbrosa*. Tropical Africa and Japan come in for their share in the distribution of *Pteris*, the latter country giving us *P. semipinnata*, *P. serrulata*, *P. Wallichiana*, &c., while from the former we have *P. biaurita*, *P. flabellata*, *P. marginata*, *P. quadriaurita*, &c.,

and species native of India are well represented by *P. ensiformis*, *P. longipinnula*, *P. ludens*, &c., as distinct from each other as they are from species of other origin.

Culture.

The plants belonging to a genus with such an extensive habitat must of necessity require different treatment according to the locality whence they have been introduced; consequently, while we have several species of *Pteris* which thrive in stove temperature only, and one at least which is perfectly hardy, there are others—and these indeed are the majority—for which a greenhouse temperature is the most suitable. Pterises are not fastidious as regards soil: and a mixture of two parts peat, one part loam, and one part sand suits most of them. The majority of them thrive as well in a place exposed to strong light as in a shady one, but this does not apply to the beautifully-variegated *P. quadriaurita argyræa*, *P. cretica albo-lineata*, *P. aspericaulis tricolor*, and *P. ensiformis Victoriæ*, all of which, either in their natural habitats or under cultivation, need a subdued light. The cause of these plants being frequently met with in a stunted condition and having a burnt appearance is generally attributable to the effects of strong light, and this is readily understood when we consider the natural conditions under which the plants flourish, being always found in the dense shade of forests where the annual rainfall is very heavy, and rarely if ever growing in Bamboo forests where the shade is partial only.

With the exception of a few species provided with creeping rhizomes, and which may be propagated by division, all Pterises are readily increased from spores, which are abundantly produced and germinate very freely.

Several species of this genus have, under culture, developed to a marked degree a tendency to variation; thus we have lightly-crested and heavily-tasselled forms of *P. cristata* and *P. serrulata;* the robust-growing *P. tremula* has also produced crested, tasselled, and variegated forms; while in *P. cretica Ouvrardi* we have a plant so far removed from the species from which it is supposed to be issue as to possess a habit entirely different from any other known species. Most, if not all, the varieties so created artificially also possess a power of reproduction which is equal to that of the typical species.

Principal Species and Varieties.

P. (Litobrochia) aculeata—Li-tob-roch′-ĭ-a ; ac-u-lĕ-a′-ta (prickly), *Swartz.*

A stove species, of large dimensions, found in the West Indies and Mexico, and extending southward to Brazil and Peru. Its ample fronds, borne on stalks 2ft. or more in length and rough with raised points, are composed of a terminal leaflet 6in. to 12in. long, cut down nearly to the rachis into lobes 1½in. to 2in. long and ¼in. broad, and of numerous lateral leaflets, the upper ones simple, the lower ones compound, sometimes 1½ft. long and 9in. broad, with numerous deeply-cleft leafits on both sides. They are naked on both surfaces, of a soft, papery texture, and their spore masses do not reach the points.—*Hooker, Species Filicum*, ii., p. 224.

P. adiantoides (or **adiantifolia**)—ad-ĭ-ant-ŏ-i′-dēs (or ad-ĭ-ant-if-ol′-ĭ-a) (having leaves like an Adiantum).

This very pretty and distinct-looking Fern, known in gardens under both names, for which we can find no authority, is *Pellæa adiantoides.*

P. albo-lineata — al-bo-li-nĕ-a′-ta (white-lined). A variegated form of *P. cretica.*

P. (Campteria) anamallayensis — Camp-te′-rĭ-a ; an-am-al-lay-en′-sis (from the Anamallay Mountains), *Beddome.*

This species, which is said to ascend in the Himalayas to 4000ft. elevation, cannot be clearly distinguished from *P. biaurita.—Hooker, Synopsis Filicum*, p. 164. *Beddome, Ferns of Southern India*, t. 45.

P. (Pæsia) aquilina—Pæs′-ĭ-a ; aq-uil-i′-na (eagle-like), *Linnæus.*

This, one of the commonest of all British Ferns, possesses a remarkably wide range of habitat, being found throughout Europe as far as Lapland ; in the Caucasus, the Ural and Altai Mountains, Siberia, China, and Kamtschatka ; throughout India, Ceylon, Penang, Java, &c. ; also at the Cape of Good Hope, at Sierra Leone, in Senegambia, Bourbon, Mauritius, Algiers, Madeira, the Azores, the Cape de Verde Islands, Guatemala, California, Mexico, Canada, Massachusetts, and Kentucky. Hooker states, in the

"Synopsis Filicum," that while in Scotland *P. aquilina* ascends to 2000ft., it reaches 7000ft. in the Cameroon Mountains, about 8000ft. in the Himalayas, and 9000ft. in Abyssinia. In Great Britain and Ireland it is found growing from the level of the sea to an altitude of 2000ft., and is thoroughly distinct by its habit as well as through its peculiar mode of growth, which is not shared by any other native Fern.

The common "Brake Fern," or "Bracken," has from time immemorial been known as a British plant. Turner, in the second part of his "Herbal," published in 1562, gives a lengthy description of the various supposed healing virtues attributed by the superstitious people of his time to the influence of Bracken seed when gathered on Midsummer Eve—statements which are all more or less ludicrous, and have long been completely refuted. It is so generally distributed all over the United Kingdom, being met with on exposed barren heaths and under the shelter of woods, that it is unnecessary to particularise the localities in which it is found. Though not nearly so particular as to the place in which it grows as are most of our other native Ferns, and thriving in any soil, except a chalky one, the Bracken does best when the latter is of a sandy nature, and, despite its somewhat common appellation, it is, when growing luxuriantly, one of the handsomest of British Ferns. In sheltered spots, the pale colour of its light, feathery fronds, which, under the influence of shade and moisture, attain their maximum of growth, renders them particularly effective; whereas the growth of the plants exposed to the effects of full light makes up for its deficiency in size, its beautiful foliage then assuming a glowing yellowish-red tint, which it retains for a very long time.

Of all our numerous native Ferns the Bracken is undoubtedly the one which is put to most profitable uses, for it possesses a few undeniably good qualities. As a vegetable manure it has few, if any, equals, for when burnt its ashes will yield double the quantity of salts produced by the burning of most other vegetables. Dr. Sprengel, who recommends this Fern as a specially good manure, says that it is most valuable through its richness in nitrogen, he having found that 100lb. of its dry foliage contains no less than $\frac{16}{100}$lb. of nitrogen. On account of its particularly strong, astringent nature, the Bracken is used in many places abroad in preparing and dressing kid and chamois leather. As a good litter in the stable and the fold, it is

known to every farmer. It is also very rich in potash, and its ashes have on that account been extensively used in glass-making. Bracken is also used in very large quantities for packing, as it forms an excellent substitute for shavings or other more expensive materials. The fattening qualities of this Fern are so well known that at Nettlecombe, in Somersetshire, it is (or was) customary to gather the young shoots of it and to simmer them in water for a couple of hours: as this cools it forms a strong jelly very useful for feeding pigs.

P. aquilina is provided with a stout, wide-creeping rhizome, which usually remains underground, and from this the fronds are produced, being placed at somewhat long intervals along its whole length. The fronds are borne on strong, erect stalks 1ft. or more in length, straw or pale chestnut coloured, and naked. The leafy portion, 2ft. to 4ft. long and 1ft. to 2ft. broad, is broadly triangular, with only the uppermost leaflets simple (undivided); those next in order are spear-shaped, cut down nearly or quite to the rachis into short, triangular leafits of a somewhat leathery texture, and with involucre double, or the inner one obsolete. They are of a somewhat leathery texture, and naked, or slightly downy, on both surfaces. — *Hooker*, *Species Filicum*, ii., p. 196. *Nicholson*, *Dictionary of Gardening*, iii., p. 240. *Beddome*, *Ferns of Southern India*, t. 42. *Eaton*, *Ferns of North America*, i., t. 35. *Lowe*, *Our Native Ferns*, ii., t. 61. *Correvon*, *Les Fougères rustiques*, p. 89.

It is acknowledged by all who have tried the experiment that the Bracken can rarely be grown successfully in pots for a long time; but it forms a noble ornament when planted in a deep, sandy soil, where the development of its fleshy rhizomes is not interfered with. In such a position it should be covered with old leaves every winter, or with its own if these are not required for other purposes. Its propagation takes place naturally by means of the spores, for it requires special care in transplanting, and can only be successfully moved when dormant in winter.

Several varieties of *P. aquilina* are known in cultivation, but with the exception of those described on pp. 260 and 261, few of them are constant. B. S. Williams states ("Select Ferns and Lycopods," p. 325) that he also received specimens of a variegated variety from Yorkshire; this, we presume, has not been constant, as it is not now found in any collection.

P. a. caudata—cau-da′-ta (tailed), *Linnæus.*

This West Indian variety, readily distinguished by the narrow form of its elongated leafits, or rather of their terminal lobe, is also a native of some parts of North America, as Eaton states that "it is not rare in Florida, and has been collected in Southern Alabama, and perhaps also in other parts of the Gulf States."—*Eaton, Ferns of North America*, i., t. 35. *Hooker, Synopsis Filicum*, p. 163.

P. a. cristata—cris-ta′-ta (crested), *Moore.*

A very distinct form, which appears to have been gathered in several parts of the United Kingdom at the same time, and which is to this day frequently met with in the neighbourhood of Tunbridge Wells. Its fronds are normal in size, but the summit of each leaflet shows various forms of cristation.—*Lowe, Our Native Ferns*, ii., fig. 828.

P. a. crispa—cris′-pa (crisped), *Wollaston.*

This pretty form, originally found on Hampstead Heath, is of a somewhat variable nature, sometimes having the margins of its leafits entire, waved, and thrown back, while in other cases they are more or less deeply notched and smooth.—*Lowe, Our Native Ferns*, ii., p. 413.

P. a. esculenta—es-cul-en′-ta (edible), *Forster.*

In this variety, which is commonly called the "Edible Fern of Tasmania," but which is also found in New Zealand and Australia, and occurs abundantly in South America, the ultimate divisions are narrower than in the typical plant; they are suddenly decurrent at the base, where they are connected by a narrow lobe.—*Hooker, Synopsis Filicum*, p. 163. *Nicholson, Dictionary of Gardening*, iii., p. 241. *Eaton, Ferns of North America*, i., t. 35. *Lowe, New and Rare Ferns*, t. 49.

P. a. furcans—fur′-cans (forked), *Lowe.*

The fronds of this variety, which was originally found near Birmingham, are provided with broad leafits, the leaflets being irregular and, like the summit of the fronds, multifid (variously branched).—*Lowe, Our Native Ferns*, ii., figs. 829 and 830.

P. a. lanuginosa—la-nu-gin-o′-sa (woolly), *Bongard.*

A variety of a downy nature, said by Eaton to be common in the region west of the Rocky Mountains, and to be especially luxuriant in Oregon and Washington Territory.—*Eaton, Ferns of North America*, ii., t. 35.

P. areolata—ar-ĕ-ol-a′-ta (furnished with little cells). Synonymous with *P. undulata.*

P. arguta—ar-gu′-ta (sharply notched), *Aiton.*

This interesting, tall-growing, stove species is a native of Madeira, St. Helena, the Canaries, the Azores, and Portugal. According to Lowe, it was introduced into the Royal Gardens, Kew, as far back as 1778. Its ample fronds, 1ft. to 3ft. long and 1ft. or more in breadth, are borne on strong, upright, glossy stalks 1ft. or more in length, of a bright straw or reddish-brown colour, with two narrow blackish bands. The terminal leaflet, 6in. to 9in. long and 1½in. to 2in. broad, is made up of numerous narrow, pointed lobes, which reach down nearly to the rachis, and are slightly toothed when barren. The lateral leaflets, of which there are several on each side, are similar to the terminal one, but usually show on their lower side one or two leafits (pinnules). The whole of the leafy portion is of a soft, papery texture, pale green in colour, and naked on both sides. The sori (spore masses), nearly $\frac{1}{24}$in. broad, do not usually extend beyond the lower half of the lobes.—*Hooker, Species Filicum*, ii., p. 184. *Nicholson, Dictionary of Gardening*, iii., p. 241. *Lowe, Ferns British and Exotic*, iii., t. 41.

P. argyræa—ar-gyr-æ′-a (silvery). This very popular Fern is a form of *P. quadriaurita.*

P. ascensionis—as-cen-sĭ-o′-nis (from Ascension Island). A variety of *P. flabellata.*

P. aspericaulis—as-per-ic-au′-lis (rough-stalked), *Wallich.*

A very handsome, stove Fern, of dwarf and compact habit, native of India. It produces from an upright rootstock fronds 1½ft. long and of a smooth, glossy nature. These are composed of one terminal and two or three pairs of lateral leaflets, the lowest pair being usually divided into two parts; they are almost stalkless and opposite, deeply cleft or even pinnate, with narrow

sickle-shaped, rather blunt leafits (pinnules) slightly toothed at the edges and minutely white-dotted beneath. The spore masses are disposed chiefly on the middle parts of the leafits. As the specific name implies, the stalks are of a rough nature ; the colour of the leafy portion of the fronds is also very attractive, being bright claret when quite young, but turning to a bronzy, metallic hue, and subsequently to a bright green colour.—*Nicholson*, *Dictionary of Gardening*, iii., p. 241. *Lowe*, *Ferns British and Exotic*, iv., t. 8.



Fig. 71. Pteris aspericaulis tricolor
(much reduced).

P. a. tricolor—tric′-ol-or (three-coloured), *Moore.*

One of the most charming Ferns ever introduced into cultivation (Fig. 71), being graceful in habit, of medium dimensions, and splendidly variegated with green, white, and red, forming a striking and very pleasing contrast. It is a native of Malaysia, whence it was introduced in or about 1862. The formation of the fronds, which occasionally attain 2ft. in length, is similar to that of the typical species, from which it is distinguished by the colour of the fronds : these, when young, are of a purplish-red or bright

rose colour, and when mature show leafits of a vivid dark green on their upper portion, while their basal part is silvery-grey, the rachis or midrib being of a bright purplish colour, which is retained as long as the frond lasts. The diversity of colours in the fronds at the same time on each plant adds considerably to its beauty. — *Nicholson*, *Dictionary of Gardening*, iii., p. 241. *Lowe*, *New and Rare Ferns*, t. 9. *Botanical Magazine* (as *P. quadriaurita tricolor*), t. 5183.

P. (Litobrochia) atrovirens — Li-tob-roch′-ĭ-a ; a′-tro-vir′-ens (dark green), *Willdenow.*

A stove species, of medium dimensions, native of the Guinea Coast and Angola, with fronds 1ft. to 2ft. long, borne on more or less prickly stalks about 1ft. long. In general outline this plant much resembles the better-known *P. quadriaurita*, from which it is principally distinguished through the intercrossing of the veins of its fronds, and through its pinnules being sometimes, but not always, furnished beneath with a row of weak prickles. Another distinctive character is that the spore masses do not reach to the point of the segments. This species is also known as *P. spinulifera.*— *Hooker*, *Species Filicum*, ii., p. 221. *Nicholson*, *Dictionary of Gardening*, iii., p. 241.

P. (Litobrochia) aurita—Li-tob-roch′-ĭ-a ; au-ri′-ta (eared). A variety of *P. incisa.*

P. Bausei—Baus′-ĕ-i (Bause's), *Moore.*

One of the most striking of all the known garden hybrids, clearly showing the distinctive characters of the parents from which, according to its raiser, it is issue. These are stated to be *P. semipinnata* and a crested form of *P. serrulata*, and *P. Bausei* appears, in habit, size, and formation of fronds, to be intermediate between the two. Its densely-tufted fronds, about 1ft. long and of a particularly erect and stiff nature, are borne on stalks 6in. long and of a deep chestnut-brown colour. The leaflets scarcely exceed 2in. in length ; the lowest are bipinnate, having four to six strap-shaped, narrow leafits (pinnules), the latter gradually diminishing in number upwards towards the summit of the frond, which for about half its length is simply pinnate, and usually, though not invariably, terminates in a tassel of greater or lesser

development. The very compact habit of this Fern, which retains its foliage for a lengthened period, renders it a most useful decorative plant for the warm conservatory and intermediate house.—*Nicholson*, *Dictionary of Gardening*, iv., p. 596.

For several years this Fern had been considered barren, and, notwithstanding repeated and numerous sowings by various cultivators in this country, no seedlings had been raised. Its fertile character has, however, now been decidedly proved, Mons. Arthur van den Heede, of Ghent, having succeeded in raising a great number of seedlings, among which several departures or variations from the type are noticed, some being indeed heavily crested, while others have lost the stiff, upright habit of the parent, and are of a much more elegant outline; but they all retain the dark glossy colour of the original plant, both in their leafy portion and in the stalks.

P. (Campteria) biaurita—Camp-te′-rĭ-a; bi-au-ri′-ta (two-eared), *Linnæus*.

This robust-growing, stove species, which differs from *P. quadriaurita* principally in its leaflets being less deeply cleft, and in the bases of the segments being connected by an arching wing, is a native of West Tropical Africa, Bourbon, Mauritius, the Himalayas (where it is found up to 4000ft. elevation), Ceylon, Java, and Tropical America, from the West Indies southwards to Brazil. Its ample fronds, borne on strong, upright, straw-coloured stalks 1ft. to 2ft. long, are composed of a terminal leaflet 6in. to 12in. long and 1½in. to 2in. broad, and of several lateral ones on each side, cut down within ¼in. of the rachis into numerous spreading, narrow-oblong lobes 1in. long and barely ¼in. broad. The lowest pair of leaflets are usually once forked. The texture of the fronds is somewhat leathery, and they are of a pale green colour and naked on both sides. The spore masses extend along the whole length of the lobes.—*Hooker*, *Species Filicum*, ii., p. 204. *Nicholson*, *Dictionary of Gardening*, iii., p. 241. *Lowe*, *Ferns British and Exotic*, iii., t. 50. *Beddome*, *Ferns of Southern India*, t. 44.

P. Boivini—Boi-vi′-ni (Boivin's). Synonymous with *Pellæa Boivini*.

P. (Litobrochia) brasiliensis—Li-tob-roch′-ĭ-a; bras-il-ĭ-en′-sis (Brazilian). A variety of *P. denticulata*.

P. brevisora—brev-is-o′-ra (having short sori), *Baker.*

A robust-growing, stove species, native of the Cameroon Mountains and Fernando Po, where it occurs at from 4000ft. to 7000ft. elevation. Its fronds, which are borne on strong, erect stalks 2ft. to 4ft. long and quite smooth, are composed of a terminal leaflet 1ft. to 2ft. long and 6in. to 9in. broad, and of two opposite lateral ones, which are nearly as large. The pinnules (leafits), 4in. to 6in. long, are again divided into numerous segments, which are narrow-oblong, blunt, and very slightly toothed; they are of a soft, papery texture, and the spore masses are disposed in a continuous line along the border of each segment.—*Hooker*, *Synopsis Filicum*, p. 162; *Second Century of Ferns*, t. 59.

P. calomelanos—cal-om-el′-an-os (beautiful black). The plant found in gardens under this name is the same as *Pellæa calomelanos.*

P. chilensis—chil-en′-sis (Chilian), *Desvaux.*

This greenhouse species, of large dimensions and upright habit, is a native of Chili and Juan Fernandez. It is closely related to *P. tremula*, from which it is distinguished principally by the shape of its segments, which are broader and shorter, and also by its barren fronds, which are finely toothed. The fronds are of a soft, papery or slightly leathery texture, and naked on both surfaces, and the spore masses extend from the base to the extremity of the segments.—*Hooker*, *Species Filicum*, ii., p. 175, t. 120A.

P. (Litobrochia) ciliaris—Li-tob-roch′-ĭ-a; cil-ĭ-a′-ris (fringed), *Eaton.*

A stove species, of medium dimensions, native of Cuba, with fronds distinctly tripinnate (three times divided to the midrib) and borne on naked, polished, straw-coloured or bright brown stalks about 1ft. long; they are 9in. to 12in. long and 6in. to 9in. broad, and their terminal leaflet is toothed when barren. The lateral leaflets vary according to their position, the uppermost pair being simple and the next forked at the base, while the lowest, about 2in. apart, are broadly triangular, 2in. to 3in. each way, and furnished with leafits having two segments on each side. The fronds are of a soft, papery texture, and naked on both sides, and their spore masses do not extend quite to the extremity of the leafits.—*Hooker*, *Synopsis Filicum*, p. 170.

P. (Doryopteris) collina — Dor-ŷ-op′-ter-is ; col-li′-na (hill-loving). Synonymous with *P. palmata.*

P. (Litobrochia) comans—Li-tob-roch′-ĭ-a ; com′-ans (hairy), *Forster.*

This stove species, with ample and distinctly-bipinnate fronds, borne on erect, naked stalks 1ft. or more in length and of a glossy nature, is a native of Juan Fernandez, Norfolk Island, New Zealand, and Tasmania. The leafy portion of its fronds is composed of a terminal leaflet 1ft. or more in length, cut down nearly to the rachis into long, narrow lobes, which are sometimes 4in. long and ½in. broad, and bluntly toothed when barren. There are also a few opposite pairs of lateral leaflets, sometimes 1½ft. long and 6in. broad, the lowest sometimes slightly compound at the base. The fronds are of a soft, thin, papery texture and naked on both sides, and the spore masses do not extend quite to the summit of the segments.—*Hooker*, *Species Filicum*, ii., p. 219. *Nicholson*, *Dictionary of Gardening*, iii., p. 241.

P. c. Endlicheriana—End-lich-e-rĭ-a′-na (Endlicher's), *Agardh.*

In this variety the fronds, which usually are much larger than in the species, have smaller lobes, with undulated margins ; their lower leaflets are very compound, and their leafits, 6in. to 9in. long, show numerous deeply-cleft, spear-shaped segments on both sides.—*Hooker*, *Icones Plantarum*, t. 973.

P. concinna—con-cin′-na (neat). A variety of *P. mutilata.*

P. coriacea—cor-ĭ-a′-cĕ-a (leathery), *Desvaux.*

A stove species, of robust habit, native of Tropical America, from Venezuela along the Andes to Peru. Its fronds, 2ft. or more in length and deltoid (in shape of the Greek delta, Δ), are borne on erect, straw-coloured stalks 1ft. to 2ft. long and of a rough nature. The terminal leaflet is 6in. to 9in. long, with numerous sickle-shaped lobes on each side ; the lower lateral ones are slightly compound below, the lowest pair being nearly as large as the central portion of the frond ; all are of a leathery texture, and their rachises (midribs) are densely clothed with minute prickles, which extend also along the midribs of the ultimate divisions beneath. The spore masses reach nearly to the extremity of the segments or lobes. — *Hooker*, *Species Filicum*, ii., p. 192, t. 124A.

P. crenata—cre-na′-ta (scalloped). The plant usually found in gardens under this name is *P. ensiformis.*

P. cretica—cre′-tic-a (Cretan), *Linnæus.*

This deservedly popular, greenhouse species is one of the most useful Ferns for decorative purposes, and the few varieties which have been produced through cultivation are all worthy of special attention. It is a native of Crete, Corsica, Italy, Abyssinia, Bourbon, Natal, Cape Colony, the Caucasus, Persia, Japan, the Himalayas (where it is said to occur at 9000ft. elevation), the Neilgherries, &c., and Eaton states that it is found growing in shady woods in Middle and Eastern Florida. According to Lowe, it was cultivated in the Royal Gardens, Kew, in 1820. Its fronds, 6in. to 12in. long and 4in. to 8in. broad, are borne on erect, wiry stalks 6in. to 12in. long. The lateral leaflets (usually two to six opposite stalkless pairs) are broadest and finely toothed when barren; the lower pairs are often cleft nearly to the base into two or three narrow leafits. They are of a somewhat leathery texture and naked on both surfaces, and the involucre (covering of the spore masses) is of a pale colour and of a parchment-like texture.—*Hooker*, *Species Filicum*, ii., p. 159. *Nicholson*, *Dictionary of Gardening*, iii., p. 241. *Lowe*, *Ferns British and Exotic*, iii., t. 43. *Eaton*, *Ferns of North America*, ii., t. 64.



Fig. 72. Pteris cretica albo-lineata (much reduced).

This species has been greatly influenced by cultivation, and forms have been produced which, though neither named nor described, bring it gradually into closer relationship with the more slender-habited *P. serrulata.* Other varieties, however, have been obtained which have been found so essentially distinct as to attract the attention of botanists, and have been duly named and described. All of these, so far as we are aware, have the power of reproducing themselves true from spores. The following are the most important:

P. c. albo-lineata—al′-bo–li-nĕ-a′-ta (white-lined), *Hooker*.

This very pretty and highly-decorative form differs from the species only in the broad belt of white down the centre of each leaflet (Fig. 72), of which it occupies one-half of the breadth. It is usually considered as a native of Japan: in contradiction to this, however, Lowe ("New and Rare Ferns," p. 59) says "it was introduced into England in 1860, having been received from the Botanic Gardens of Java." He also adds that some hundreds of plants of it had been raised at the Royal Gardens, Kew, from spores and that every one was quite true, not a single normal green frond being found among them. It is also stated in the "Synopsis Filicum" (p. 154) that it had been gathered in Brazil by Dr. Glaziou. — *Hooker*, *Synopsis Filicum*, p. 154. *Botanical Magazine*, t. 5194.

P. c. major—ma′-jor (greater). This is identical with *P. c. Ouvrardi*.

P. c. Mayii—May′-ī-i (May's), *Moore*.

In this remarkable variety the variegated character observed in *P. c. albo-lineata* is retained, the white band in each leaflet forming a striking and most pleasing contrast with the bright green colour of the edge (see Coloured Plate). The plant, however, is of dwarfer habit and smaller dimensions, and is further rendered very attractive by the cristation of its fronds, all the leaflets, either barren or fertile, terminating in crests of various sizes. This elegant form also reproduces itself true from spores.

P. c. nobilis—no′-bil-is (noble), *May*.

This variety is totally different in habit from those already described, being of a stiff, upright growth throughout. Barren and fertile fronds alike are borne on stiff stalks of a brownish colour; they are of about uniform size, and their leafy portion is of a very pleasing pale green colour. This form is constant under cultivation, and may be readily propagated from spores.

P. c. Ouvrardi—Ouv-rar′-di (Ouvrard's), *Schneider*.

The classification of this beautiful and exceedingly useful, greenhouse Fern (see Plate) is very doubtful, as the plant is undoubtedly a form intermediate between *P. cretica* and *P. umbrosa*, an improvement on both as a decorative subject and yet so thoroughly distinct in itself as to be more

than a mere variety of either. It is of garden origin and was raised in Mr. J. Ouvrard's Nursery, at Child's Hill, Kilburn, where both the above-named species were then grown in large quantities. Its very handsome fronds, borne on stalks 1ft. to 2ft. long, are 1ft. to 1½ft. long, of upright habit, and very robust. In this way it is very distinct from *P. cretica*, and it differs essentially from *P. umbrosa* through its mode of growth, the fronds being produced from a spreading central crown and not from an underground, creeping rhizome, as are those of the latter species. This Fern, which is also sometimes met with in gardens under the name of *P. cretica major*, is so well appreciated by the decorator that it has, for his purpose, entirely supplanted the two species from which it is supposed to be issue. It is a quicker grower than either of these and reproduces itself true from spores.

P. c. stenophylla—sten-oph-yl′-la (narrow-leaved), *Hooker*.

In this variety, which is not the result of cultivation, but which occurs spontaneously in Northern India and the Philippine Islands, the fronds are digitate (disposed like fingers), being composed of three to five leaflets only; these are narrow, entire or nearly so, and clustered at the summit of the stalks.—*Hooker and Greville, Icones Filicum*, t. 130. *Eaton, Ferns of North America*, ii., p. 145.

P. crispa—cris′-pa (curled). The plant found in gardens under this name is synonymous with *P. straminea*.

P. (Litobrochia) Currori—Li-tob-roch′-ĭ-a; Cur-ro′-ri (Dr. Curror's), *Hooker*.

This gigantic-growing, stove species, with ample fronds several feet long and 2ft. or more in breadth, borne on stout, erect, naked stalks of a peculiar straw colour, is a native of West Tropical Africa, having been discovered at or near Elephant's Bay, and also on the Mountains of Fernando Po, where it occurs at elevations varying between 3000ft. and 5000ft. The terminal leaflet is deeply lobed; the lateral ones, 16in. long and 5in. broad, are numerous and disposed in opposite, stalkless pairs, with the margin deeply and broadly waved. Their texture is soft and papery, and they are slightly hairy on both surfaces. The spore masses are disposed in numerous patches, which are sometimes interrupted and very short.—*Hooker, Species Filicum*, ii., p. 232, t. 140. *Nicholson, Dictionary of Gardening*, iii., p. 241.

P. Dalhousiæ—Dal-hou′-sĭ-æ (Lady Dalhousie's), *Hooker.*

A stove species, of large dimensions, native of Penang and Java, and very distinct from any other species in the group. Its fronds, 2ft. to 3ft. long, 1ft. to 1½ft. broad, and borne on strong, upright, polished stalks about 1ft. high, are three or four times divided nearly to the midrib. In their upper portion they are composed of unbranched leaflets ; in their lower parts the leaflets, sometimes 1ft. long, are furnished with simple or occasionally branched, narrow segments of a somewhat leathery texture and naked on both surfaces. The spore masses, which do not reach to their extremity, are covered with a narrow involucre of a parchment-like texture. — *Hooker*, *Species Filicum*, ii., p. 170, t. 121A. *Beddome*, *Ferns of British India*, t. 191.

P. decomposita—de-com-pos′-it-a (much divided), *Baker.*

This very distinct and remarkable, greenhouse species is a native of the Andes of Peru, where it occurs at 10,000ft. elevation. It is of robust habit, with fronds 3ft. to 4ft. long, their lowest leaflets often measuring 2ft. in length, with many pinnules (leafits) divided again into deeply-cleft segments. The fronds are of a stiff and somewhat leathery texture and naked on both surfaces, and the spore masses do not extend to their extremities.—*Hooker*, *Synopsis Filicum*, p. 479.

P. (Doryopteris) decora—Dor-ў-op′-ter-is; dec-o′-ra (decorous), *Brackenridge.*

A stove species, of small dimensions, native of the Sandwich Islands. Its singular and pretty fronds, borne on erect, wiry stalks 6in. to 8in. long and of a dark chestnut-brown colour, are 3in. to 4in. each way, and are composed of a narrow terminal lobe, two or three pairs of similar lateral ones, and below these two pairs of compound leaflets, the lowest cut down again into three divisions. They are of a leathery texture, naked on both surfaces, and the spore masses reach to the extremity of the lobes.—*Hooker*, *Species Filicum*, ii., p. 210.

P. decussata—dec-us-sa′-ta (cut crosswise). Synonymous with *P. patens.*

P. deflexa—de-flex′-a (deflexed), *Link.*

This stove species, which is found in Tropical America, from the West Indies southward to Brazil and Peru, has its ample fronds, 2ft. to 4ft. long,

borne on strong, upright, naked stalks 2ft. or more in length. The terminal leaflet, 6in. to 9in. long, ends in a long point, and has numerous linear-oblong lobes on each side; the lateral leaflets, which are numerous, are similar to the terminal one, but the lowest pair are much larger than the others, being often more than 1ft. long and 6in. to 9in. broad, with numerous leafits on each side. The fronds are of a leathery texture and naked on both sides; and the spore masses reach nearly to their extremity.—*Hooker*, *Species Filicum*, ii., p. 190. *Nicholson*, *Dictionary of Gardening*, iii., p. 241.

P. (Litobrochia) denticulata—Li-tob-roch′-ĭ-a; den-tic-ul-a′-ta (slightly toothed), *Swartz.*

This stove species, native of Tropical America, from the West Indies southward to Brazil, much resembles *P. cretica* in general aspect. Its fronds, 1ft. to 2ft. long and 8in. to 12in. broad, are borne on slender, naked stalks about 1ft. long and of a wiry nature. Their leaflets, when barren, are finely toothed along the edges (Fig. 73), and in the lower part of the frond they are often deeply cleft into narrow leafits, especially on the lower side. The fronds are of a somewhat leathery texture, and naked on both sides, and the spore masses do not reach quite to their extremity.—*Hooker*, *Species Filicum*, ii., p. 215. *Nicholson*, *Dictionary of Gardening*, iii., p. 241. *Lowe*, *Ferns British and Exotic*, iv., t. 1.

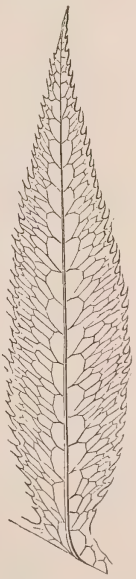


Fig. 73. Barren Upper Pinna of Pteris denticulata (nat. size).

P. d. brasiliensis—bras-il-ĭ-en′-sis (Brazilian), *Raddi.*

In this variety, the leaflets, which are broader than in the type, being 6in. to 9in. long and 1in. broad, are also more divided.—*Hooker*, *Species Filicum*, ii., p. 214.

P. (Litobrochia) elata—Li-tob-roch′-ĭ-a; e-la′-ta (tall), *Agardh.*

A tall-growing, stove species, native of Tropical America, from Panama southward to Ecuador. Its ample fronds, three times divided, are borne on

upright, straw-coloured stalks 2ft. to 3ft. long and glossy. The terminal leaflet, 1ft. to 1½ft. long, is cut down nearly or quite to the rachis into numerous narrow lobes on each side, finely toothed when barren. The upper lateral leaflets, 6in. long, are not cut down to the rachis; the lower ones equal in size and cutting the terminal one, and make the frond 2ft. to 3ft. broad at the base. All are of a somewhat leathery texture and naked on both sides, and the spore masses fall short of the points of the segments. —*Hooker*, *Species Filicum*, ii., p. 223. *Nicholson*, *Dictionary of Gardening*, iii., p. 242.

P. elegans—e′-leg-ans (elegant). A garden name for *P. nobilis*.



Fig. 74. Pteris ensiformis
(nearly nat. size).

P. ensiformis—en-sif-or′-mis (sword-shaped), *Burmann*.

This greenhouse species, of small dimensions, better known under the name of *P. crenata*, has a wide range of habitat, being found from the Himalayas to Ceylon, Chusan, and the Loo-Choo Islands, southward to Tropical Australia, and eastward to Samoa and Fiji. Its fronds, borne on slender, erect, straw-coloured stalks 3in. to 6in. long, are 6in. to 12in. long, 3in. to 6in. broad, and composed of a long terminal leaflet and from two to four pairs of lateral ones, much resembling those of *P. cretica*, but the fertile ones, slightly compound, are cut down to the rachis below into two to six sharply-toothed leafits (Fig. 74, reduced from Col. Beddome's "Ferns of Southern India," by the kind



Platycerium Willinckii

(much reduced).

permission of the author). Their texture is leathery, they are naked on both surfaces, and the involucre covering the spore masses is of a brownish colour. —*Hooker*, *Species Filicum*, ii., p. 163, t. 127A.

P. e. variegata — var-ĭ-eg-a′-ta (variegated). This is an older name for *P. e. Victoriæ*.

P. e. Victoriæ—Vic-to′-rĭ-æ (Victoria's), *W. Bull.*

This variety, which is exactly the same plant as *P. e. variegata* of Moore, previously introduced, is a remarkably slender and graceful form, producing two entirely distinct sorts of fronds, the barren ones being small and prostrate, while the fertile ones, upright and abundant, are 1¼ft. to 1½ft. long, composed of narrow leaflets about ⅛in. broad, and beautifully variegated throughout.

Although this elegant Fern reproduces itself very freely from spores, some of the seedlings are thoroughly distinct. Among these we may particularly note *reginæ*, which has the variegation running in narrow stripes to the margins of the leaflets, and is of more vigorous growth than *Victoriæ;* and *cristata*, a form with very prettily and regularly crested fronds, which are also beautifully and distinctly variegated.

P. esculenta—es-cul-en′-ta (edible). A variety of *P. aquilina.*

P. excelsa—ex-cel′-sa (high), *Gaudichaud.*

This stove species, which greatly resembles *P. quadriaurita*, but is much larger, is a native of the Philippine and Sandwich Islands; it is also said to occur in the Himalayas up to 8000ft. elevation.—*Hooker*, *Species Filicum*, ii., p. 183, t. 136. *Beddome*, *Ferns of British India*, t. 218.

P. fallax—fal′-lax (deceptive). Synonymous with *Pellæa intramarginalis serratifolia.*

P. felosma—fel-os′-ma (heavy-smelling). A form of *P. quadriaurita.*

P. flabellata—fla-bel-la′-ta (fan-shaped), *Thunberg.*

A greenhouse species, found in Cape Colony, and northward to Bourbon, Abyssinia, and Fernando Po. It is closely related to *P. arguta.* Its fronds, 1ft. to 3ft. long and 1ft. or more in breadth, are borne on strong, upright

stalks 1ft. or more in length and of a glossy nature. The terminal leaflet, 6in. to 12in. long and 2in. to 3in. broad, is made up of numerous narrow lobes, which reach down nearly to the rachis and are finely toothed when barren. The several pairs of lateral leaflets are similar to the terminal one, the lowest showing one to three small pinnules (leafits) at the base on the lower side. The fronds are of a soft, papery texture and naked on both surfaces, and the narrow sori (spore masses) form a continuous line along nearly the whole length of the leafits.—*Hooker*, *Species Filicum*, ii., p. 185. *Nicholson*, *Dictionary of Gardening*, iii., p. 242.

P. f. ascensionis—as-cen-sĭ-o′-nis (from Ascension Island), *Swartz.*

This variety is of much smaller dimensions than the species, its lower leaflets sometimes showing several small, compound leafits on both sides. It naturally grows in a very exposed situation and has more or less horizontal fronds with ascending or nearly upright leaflets.—*Hooker*, *Synopsis Filicum*, p. 161.

P. (Litobrochia) Fraseri—Li-tob-roch′-ĭ-a ; Fra′-ser-i (Fraser's), *Mettenius.*

This very distinct, stove species, native of the Andes of Ecuador, is a strong-growing plant, with fronds broadly triangular, three times divided, measuring about 3ft. each way, and borne on tufted, naked stalks sometimes 4ft. to 5ft. long. Both surfaces are smooth and of a bright green colour. The fertile portions are narrow, and the sori (spore masses) extend to their extremity.—*Hooker*, *Synopsis Filicum*, p. 480.

P. geranifolia — ger-an-if-ol′-ĭ-a (Geranium-leaved). The plant found in gardens under this name is *Pellæa geraniæfolia.*

P. Ghiesbreghtii — Ghies-bregh′-tĭ-i (Ghiesbreght's). A variety of *P. laciniata.*

P. (Litobrochia) gigantea — Li-tob-roch′-ĭ-a ; gig-ant-e′-a (gigantic), *Willdenow.*

A very large-growing, stove species, native of the West Indies, Colombia, and Peru, with fronds three times divided and borne on stout, erect, naked stalks 2ft. to 3ft. long. The terminal leaflet, 1ft. long and 3in. broad, is cut

down to a broadly-winged rachis into numerous narrow, sickle-shaped lobes, which are slightly and bluntly toothed when barren; the lateral ones are numerous and often measure 1½ft. in length and 4in. in breadth. The leaflets are further divided into pinnules (leafits) nearly 2in. long. The texture of the fronds is leathery, and they are naked on both sides, the spore masses falling short of the extremity of the segments.—*Hooker*, *Species Filicum*, ii., p. 217.

P. glauca—glau′-ca (bluish-green). Synonymous with *Pellæa glauca.*

P. gracilis—grac′-il-is (slender). Synonymous with *Pellæa gracilis.*

P. (Heterophlebium) grandifolia—Het-er-oph-leb′-ĭ-um; gran-dif-ol′-ĭ-a (large-leaved), *Linnæus.*

This stove species, of medium dimensions, which, according to Lowe, was introduced into England in 1793, is a native of the West Indies, Mexico, and

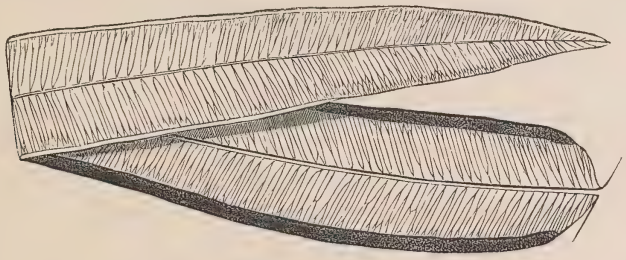


Fig. 75. Pinna of Pteris grandifolia
(nat. size).

Peru. Its simply-pinnate (once-divided) fronds, 1ft. to 2ft. long, are borne on erect, straw-coloured stalks 6in. to 12in. long. The leaflets are narrow, tapering to a sharp point (Fig. 75), of a leathery texture, and naked on both surfaces. The spore masses are often continuous along the whole length of the leaflets.—*Hooker*, *Species Filicum*, ii., p. 201, t. 113B. *Nicholson*, *Dictionary of Gardening*, iii., p. 242. *Lowe*, *Ferns British and Exotic*, iii., t. 49.

P. (Litobrochia) grandis—Li-tob-roch′-ĭ-a; gran′-dis (large). A garden name for *P. nobilis.*

P. Griffithii—Grif-fith′-ĭ-i (Griffith's), *Hooker.*

A small-growing, stove species, native of Northern India, with broadly spear-shaped fronds 6in. to 8in. long, borne on slender, erect stalks of the same length and of a wiry nature. The upper lateral leaflets are simple and not more than ¼in. apart; the lower ones are 2in. to 3in. apart and are divided to the midrib, their lowest leafits being frequently divided again; all are of a somewhat leathery texture, naked on both surfaces, and the involucre which covers the spore masses is narrow and of a parchment-like texture. Fig. 76 is reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author.—*Hooker, Species Filicum*, ii., p. 170, t. 123A. *Beddome, Ferns of British India*, t. 24.



Fig. 76. Pteris Griffithii (½ nat. size).

P. (Litobrochia) Hænkeana — Li-tob-roch′-ĭ-a; Hænk-ĕ-a′-na (Hænke's), *Presl.*

A stove species, native of Guatemala, New Granada, and Peru, with fronds only once divided to the midrib, of a leathery texture, and naked on both surfaces. The spore masses do not reach quite to the extremity of the leaflets. This species is of little decorative value.—*Hooker, Species Filicum*, ii., p. 213.

P. hastata — has-ta′-ta (spear-shaped). This is synonymous with *Pellæa hastata.*

P. heterophylla—het-er-oph-yl′-la (having variable fronds), *Linnæus.*

This stove species, native of Brazil and the West Indies, is of medium size only. Its broadly-triangular fronds, 6in. to 12in. long, 3in. to 6in. broad, and three times divided to the midrib, are borne on wiry, slender, naked stalks of a peculiar straw-colour. With the exception of two or three of the uppermost leaflets, all are compound, with leafits again deeply cleft, their ultimate segments being egg-shaped, sharply and deeply toothed, wedge-shaped and entire at the base, of a thin, papery texture, bright green and naked on

both surfaces. The involucre covering the spore masses is broad, pale, and of a parchment-like texture.—*Hooker*, *Species Filicum*, ii., p. 166. *Nicholson*, *Dictionary of Gardening*, iii., p. 242.

P. Hookeriana—Hook-er-ĭ-a′-na (Hooker's), *Agardh.*

This stove species, of small dimensions, is a native of Adam's Peak, Ceylon, where it occurs at about 2000ft. elevation. Its fronds, 9in. to 12in. long and 6in. to 9in. broad, are borne on naked, erect, pale stalks 6in. to 12in. long; they are composed of a long, entire terminal leaflet and from two to six pairs of stalkless, opposite lateral ones, the lowest of which is forked at the base on one or on both sides. The fronds are of a leathery texture, naked on both surfaces, and the narrow involucre covering the spore masses is of a brownish colour.—*Hooker*, *Species Filicum*, ii., p. 165. *Nicholson*, *Dictionary of Gardening*, iii., p. 242. *Beddome*, *Ferns of Southern India*, t. 40.

P. (Litobrochia) incisa—Li-tob-roch′-ĭ-a; in-ci′-sa (cut), *Thunberg.*

This strong-growing, thoroughly distinct, greenhouse species, which, in gardens, is better known under the name of *Litobrochia vespertilionis*, or "Bat-winged Fern," has a very wide range of habitat. According to Lowe, it is a native of Australia and New Zealand, and was raised from spores in the Royal Gardens, Kew, in 1838; but it is also found all over Tropical America, from the West Indies and Columbia, southward to Chili, Juan Fernandez, and Brazil; on the Himalayas, in Cape Colony, in West Tropical Africa, &c. Its handsome fronds, often several feet long, are bi- or tripinnate (twice or three times divided to the rachis) and borne on stout, erect, polished, straw-coloured or light brown stalks, sometimes slightly rough towards the base. The uppermost leaflets only are simply pinnate, those next in order being divided into numerous deeply-cleft leafits 2in. to 3in. long and opposite, the lowest often quite close to the stalk; all are of a soft, papery texture, pale green above, and of a glaucous (bluish-green) colour beneath. The sori (spore masses), which are sometimes interrupted and sometimes form a continuous line, often reach the point of the leafits.—*Hooker*, *Species Filicum*, ii., p. 230. *Nicholson*, *Dictionary of Gardening*, iii., p. 242. *Lowe*, *Ferns British and Exotic*, iii., t. 44.

P. i. aurita—au-ri′-ta (eared), *Blume.*

This form is readily distinguished from the typical plant through its lowest pair of leafits being quite entire and closely pressed against the stalk at the base of the leaflet. Fig. 77 is reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author.—*Hooker, Species Filicum*, ii., p. 231. *Beddome, Ferns of Southern India*, t. 221.

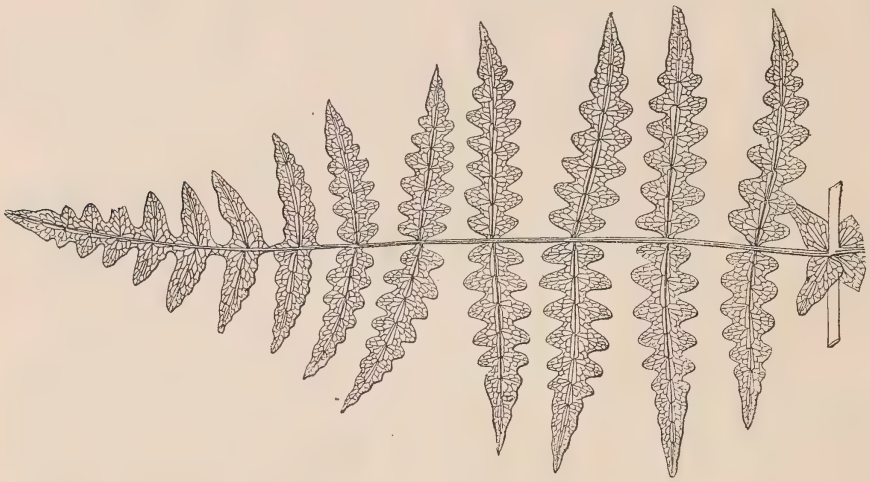


Fig. 77. Pinna of Pteris incisa aurita
(nearly nat. size).

P. intramarginalis—in-tra-mar-gin-a′-lis (involucred within the margin). A garden name for *Pellæa intramarginalis.*

P. irregularis—ir-reg-ul-a′-ris (irregular), *Kaulfuss.*

A stove species, of medium dimensions, native of the Sandwich Islands. It resembles *P. Dalhousiæ*, but is distinguished by its leafits being pinnate instead of mostly forked.—*Hooker, Species Filicum*, ii., p. 173.

P. (Litobrochia) Junghuhnii—Li-tob-roch′-ĭ-a; Jung-huhn′-ĭ-i (Jung-huhn's), *Baker.*

A stove species, native of Java, much resembling *P. quadriaurita*, but of firm texture and with leaflets having an undivided central space more than ¼in. in breadth.—*Hooker, Synopsis Filicum*, p. 170.

P. Kingiana—King-ĭ-a′-na (King's). This is a variety of the popular *P. tremula.*

P. (Litobrochia) Kunzeana—Li-tob-roch′-ĭ-a ; Kunz-ĕ-a′-na (Kunze's), *Agardh.*

A strong-growing, stove species, native of Tropical America, its habitat extending from the West Indies and Ecuador southward to Peru. Its ample fronds, borne on strong, erect, straw-coloured or reddish-brown stalks 3ft. long, have their terminal leaflet 1ft. long, 3in. broad, and cut down two-thirds of the way to the rachis into numerous narrow, sharp-pointed, sickle-shaped lobes. The numerous lateral leaflets are disposed in nearly opposite pairs, the lower ones being stalked ; the lowest pair are large, deltoid (in shape of the Greek delta, Δ), compound below, and furnished with smaller similar-shaped leafits ; all are of a leathery texture and naked on both surfaces. The spore masses fall short of the extremity of the leafits.—*Hooker*, *Species Filicum*, ii., p. 221, t. 139.

P. laciniata—lac-in-ĭ-a′-ta (torn), *Willdenow.*

This stove species, sometimes found in gardens under the name of *Lonchitis hirsuta*, is a native of the West Indies, Mexico, and Peru. Its fronds, deltoid and tripinnatifid (in form of the Greek delta, Δ, and three times divided nearly to the midrib), are 1ft. to 2ft. long, and borne on stout, erect stalks 1ft. or more in length and very hairy. The lower leaflets, 1ft. to 1½ft. long and 6in. to 9in. broad, are furnished on each side with numerous spear-shaped leafits, which are cut down to a broadly-winged rachis into lobes ½in. long and ¼in. broad. These lobes are of a soft, papery texture, hairy on both surfaces, and the spore masses do not reach their point.—*Hooker*, *Species Filicum*, ii., p. 176, t. 132B. *Nicholson*, *Dictionary of Gardening*, iii., p. 243.

P. l. Ghiesbreghtii—Ghies-bregh′-tĭ-i (Ghiesbreght's), *J. Smith.*

This plant, which is the *Lonchitis Ghiesbreghtii* of Linden, is a variety with foliage less hairy throughout.—*Hooker*, *Synopsis Filicum*, p. 160.

P. (Litobrochia) lanceæfolia—Li-tob-roch′-ĭ-a ; lan-cĕ-æ-fol′-ĭ-a (having spear-shaped leaves), *Agardh.*

A stove species, from Madagascar, with simply-pinnate fronds 1ft. to 1½ft. long, 6in. to 9in. broad, and borne on erect, pale, glossy stalks. The narrow,

entire, slightly-stalked leaflets are 4in. to 6in. long and ½in. broad, and the lowest of them are disposed about 1in. apart; they are of a somewhat leathery texture, and naked on both surfaces. The very narrow spore masses fall short of the points of the leaflets.—*Hooker*, *Species Filicum*, ii., p. 212.

P. (Amphiblestra) latifolia — Am-phib-le′-stra; la-tif-ol′-ĭ-a (large-leaved), *Humboldt, Bonpland, and Kunth.*

The fronds of this stove species, native of Venezuela, are 1ft. to 2ft. long, and are composed of a large terminal leaflet and a pair of lateral ones. The former has an oblong-triangular, waved, and pointed extremity, while the latter, sometimes 1ft. long and 2in. broad, are nearly entire; all are of a soft, papery texture, and have their principal veins running nearly parallel, about 1in. apart. The spore masses seldom extend to the extremity of the lateral leaflets, while the terminal one is usually barren. *P. latifolia* of gardens is identical with *Pellœa adiantoides.*—*Hooker*, *Species Filicum*, ii., p. 233.



Fig. 78. Central Pinna of Pteris leptophylla (½ nat. size).

P. (Litobrochia) leptophylla—Li-tob-roch′-ĭ-a; lep-toph-yl′-la (slender-leaved), *Swartz.*

A very pretty and thoroughly distinct, delicate-looking, stove species, of small dimensions, native of Brazil, and, according to Lowe, raised in the Royal Gardens, Kew, in 1834. Its finely-divided fronds, 9in. to 12in. each way, are borne on erect, slender, straw-coloured stalks 6in. to 9in. long. A few of their upper leaflets are simple; the largest of these are less than 1in. long, about ⅛in. broad, and strongly toothed when barren, but smooth when fertile; the central ones (Fig. 78) are spear-shaped and deeply cleft into narrow leafits; while the lowest are deltoid (in form of the Greek delta, Δ) and furnished with numerous leafits often 2in. long and again deeply cleft. The fronds are of a soft, papery texture, greyish-green in colour, and naked on both surfaces. The spore masses sometimes, but rarely, reach the

points of the leafits.—*Hooker*, *Species Filicum*, ii., p. 216 ; *Garden Ferns*, t. 23. *Nicholson*, *Dictionary of Gardening*, iii., p. 243. *Lowe*, *Ferns British and Exotic*, iii., t. 47.

P. litobrochioides—li-tob-roch′-ĭ-ŏ-ĭ′-dēs (Litobrochia-like), *Klotzsch.*

A stove species, of medium dimensions, native of British Guiana and the Amazon Valley. Its fronds, 2ft. long and 1½ft. broad, are borne on strong, upright, naked stalks of a bright chestnut-brown colour ; they are composed of a terminal leaflet 1ft. long, 2in. to 3in. broad, cut down to within a short distance of the rachis into numerous spreading, narrow, entire lobes ; and of three or four lateral leaflets on each side similar to the terminal one, the lowest 3in. or 4in. distant at the base, all unbranched and of a leathery texture. The fronds are naked on both surfaces, and the spore masses reach nearly to the extremity of the lobes.—*Hooker*, *Species Filicum*, ii., p. 178.

P. (Heterophlebium) lomariacea—Het-er-oph-leb′-ĭ-um ; lo-ma-rĭ-a′-cĕ-a (Lomaria-like), *Kunze.*

This stove species, of small dimensions, with fronds about 4in. each way, and borne on wiry, dark chestnut-brown stalks 6in. to 12in. long, is a native of British Guiana, Peru, and Brazil. It closely resembles the better-known *P. palmata* in habit, differing from that popular species principally in the nature of its venation.—*Hooker*, *Synopsis Filicum*, p. 164.

P. longifolia—long-if-ol′-ĭ-a (long-leaved), *Linnæus.*

This deservedly popular, greenhouse species, particularly useful on account of its decorative qualities and easy culture, is said by Lowe to have been introduced into England in the year 1770. Its range of habitat is unusually extensive, it being found wild in tropical and warm temperate regions all round the world. Its fronds, broadly spear-shaped in form, are simply pinnate (only once divided to the rachis), 1ft. to 2ft. long, and 6in. to 9in. broad ; they are borne on stout, upright stalks 6in. to 12in. long and more or less densely clothed in their lower part with narrow scales of a pale brown colour. The sessile (stalkless) leaflets, 3in. to 6in. long and seldom more than ½in. broad, are sometimes slightly eared at the base ; they are of a somewhat leathery texture and naked and dark green on both surfaces. The sori

(spore masses) fall short of the points of the leaflets, and are covered by an involucre of parchment-like texture and of a yellowish-brown colour.—*Hooker*, *Species Filicum*, ii., p. 157. *Nicholson*, *Dictionary of Gardening*, iii., p. 243. *Lowe*, *Ferns British and Exotic*, iii., t. 42. *Beddome*, *Ferns of Southern India*, t. 33. *Eaton*, *Ferns of North America*, ii., t. 78.

It is worthy of remark that although hundreds of thousands of plants of this species are annually grown for market, no variation has ever been found amongst them. The only deviations from the typical plant at present known are the following, neither of which owes its existence to culture:

P. l. Mariesii—Ma-ries′-ĭ-i (Maries's), *Schneider*.

This exceedingly pretty variety, found growing wild by Mr. Ch. Maries in Penang, is remarkable for the elegance of its fronds, which, like those of the species, are simply pinnate, and for its habit, which is compact, yet very graceful. The fronds are abundantly produced from a rootstock which, unlike that of the species, branches very freely; their rachis (stalk of the leafy portion) is of a very slender nature, and the leaflets, much narrower than those of *P. longifolia* and reaching nearly to the base of the stalk, are slightly undulated and of a most pleasing pale green colour. This variety has been found to propagate itself perfectly true from spores, which are produced very freely.

P. l. nobilis—no′-bil-is (noble), *Baker*.

This is a gigantic form, of upright habit, introduced from the South Sea Islands in 1884. It differs from the species only in the dimensions of its fronds, which are 4ft. to 5ft. long, and furnished with narrow leaflets 8in. to 10in. long.—*Nicholson*, *Dictionary of Gardening*, iv., p. 597.

P. longipes—long′-ip-ēs (long-stalked), *Don*.

A stove species, native of the Eastern Himalayas, Ceylon, and New Guinea. Its fronds are composed of a terminal leaflet about 6in. long and 1in. broad, with numerous lobes on each side, and of numerous lateral leaflets, disposed about 1in. apart: the upper ones are simple and about 6in. long; the lowest are compound, sometimes nearly as large as the central portion of the frond, being 1ft. long and 6in. broad; all are of a soft, papery texture,

and naked on both surfaces. The spore masses fall short of the extremity of the leafits. *P. pellucens* is identical with this species.—*Hooker*, *Species Filicum*, ii., p. 191. *Nicholson*, *Dictionary of Gardening*, iii., p. 243.

P. longipinnula—long-ip-in′-nul-a (having long leafits), *Wallich.*

This species, which is found in India, Borneo, and Japan, and which is stated to occur at elevations between 2000ft. and 4000ft. on the Himalayas, is so closely related to *P. quadriaurita* that Baker considers it as very doubtfully distinct from that species.—*Hooker*, *Synopsis Filicum*, p. 159.

P. (Doryopteris) ludens—Dor-ў-op′-ter-is ; lu′-dens (sportive), *Wallich.*

This very distinct, stove species, native of Malaysia and the Philippine Islands, is of medium dimensions only, and produces, from a wide-creeping rootstock thicker than a crow's quill, barren and fertile fronds which are totally distinct from each other. The former, borne on slender, nearly black, polished stalks 3in. to 4in. long, vary in shape from triangular with two slightly-deflexed basal lobes to hastate (halbert-shaped), and have their margin entire. The fertile ones are borne on stalks often 1ft. long ; they are 4in. to 6in. each way, and are cut down into five narrow-spear-shaped lobes, one (the terminal) erect, two spreading, and two (the lowest ones) deflexed, all of which except the terminal one are sometimes again forked (Fig. 79, reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author). They are of a leathery texture, and the sori (spore masses) form a continuous line all round the margin.—*Hooker*, *Species Filicum*, ii., p. 210. *Beddome*, *Ferns of British India*, t. 27.



Fig. 79. Pteris ludens
(¼ nat. size).

P. (Litobrochia) macilenta — Li-tob-roch′-ĭ-a ; mac-il-en′-ta (thin), *Cunningham.*

This particularly well-marked, greenhouse species, is a native of New Zealand only. Its fronds, produced from a compact crown, and borne on

naked, straw-coloured or brownish stalks 6in. to 12in. long, are from 1ft. to 3ft. long. The terminal leaflet is cut down nearly to the rachis into several deeply waved and toothed, oblong lobes on each side; the lateral leaflets are numerous, the upper ones being 2in. apart at the base and cut down quite to the rachis below into deeply-lobed, triangular leafits, while the lower ones are 1ft. long and very compound; all are of a thin, papery texture, and pale green in colour. The spore masses do not reach quite to the point of the leafits. — *Hooker*, *Species Filicum*, ii., p. 219. *Nicholson*, *Dictionary of Gardening*, iii., p. 243.

P. (Litobrochia) macroptera — Li-tob-roch′-ĭ-a; mac-rop′-ter-a (large-winged), *Link*.

A somewhat coarse-growing, stove species, native of Brazil, with fronds 2ft. or more in length, 1ft. to 1½ft. broad, cut down very nearly to the rachis in the upper part into numerous narrow lobes, the lowest of which are 6in. to 9in. long, with about 1in. between them at the base, the point being very gradually narrowed. The lateral leaflets are few (often a single pair only) and resemble the terminal one, but are smaller. The fronds are of a soft, papery texture, bright green in colour, and naked on both surfaces. The spore masses do not reach to the extremity of the leafits.—*Hooker*, *Synopsis Filicum*, p. 169. *Nicholson*, *Dictionary of Gardening*, iii., p. 243. *Lowe*, *Ferns British and Exotic*, iv., t. 7.

P. madagascarica—mad-ag-as-car′-ic-a (Madagascarian), *Agardh*.

A strong-growing, stove species, with ample, bipinnate fronds composed of a terminal leaflet and of several pairs of stalked lateral ones furnished with stalked leafits 2in. long and deeply toothed towards the point. The texture is leathery, and the involucre covering the spore masses is narrow and of a firm nature.—*Hooker*, *Species Filicum*, ii., p. 171, t. 122A.

P. (Litobrochia) Mannii—Li-tob-roch′-ĭ-a; Man′-nĭ-i (Mann's), *Baker*.

This stove species is of little decorative value, though of very distinct appearance. Its fronds, 1ft. to 1½ft. long, 6in. to 9in. broad, and of a soft, papery texture, are borne on slender, zigzag stalks 3ft. or more in length and of a downy nature. It is a native of Fernando Po.—*Hooker*, *Synopsis Filicum*, p. 168.

P. marattiæfolia—mar-at-tĭ-æ-fol′-ĭ-a (Marattia-leaved), *Hooker.*

A very distinct, stove species, native of Chili and Chiloe, with ample, bipinnate fronds borne on stout, erect, four-angled, straw-coloured, glossy stalks. Their upper portion is only once divided into several narrow lobes prominently toothed towards the base. The lower leaflets, 6in. to 12in. long, are pinnate, being furnished with similar lobes on both sides and again compound with smaller leafits on both sides at the base. The texture of the fronds is somewhat leathery, and they are naked on both surfaces. The spore masses fall short of the extremity of the leafits.—*Hooker, Species Filicum*, ii., p. 177, t. 122B.

P. (Litobrochia) marginata—Li-tob-roch′-ĭ-a ; mar-gin-a′-ta (margined), *Bory.*

A strong-growing, stove species, native of Malaysia, the Philippine Islands, Mauritius, West Tropical Africa, &c. Its fronds are borne on strong, upright, naked, brownish or straw-coloured, polished stalks 1ft. or more in length ; they are composed of a terminal leaflet 6in. to 9in. long and ½in. to 1in. broad, cut down nearly to the midrib into numerous closely-placed lobes on each side, which are very slightly toothed when barren, and of numerous lateral leaflets also closely set. These fronds are naked on both surfaces, and are of a soft, papery texture, with the spore masses falling rather short of the point of the leaflets.—*Hooker, Species Filicum*, ii., p. 225.

P. (Campteria) maxima—Camp-te′-rĭ-a ; max′-im-a (greatest), *Baker.*

A strong-growing Fern, of little decorative value, and which Baker considers as scarcely more than a variety of *P. biaurita*. It is a native of the Isle of Mayotte.—*Hooker, Synopsis Filicum*, p. 480.

P. (Litobrochia) Milneana—Li-tob-roch′-ĭ-a ; Mil-nĕ-a′-na (Milne's), *Baker.*

This robust, stove species, native of Fiji and the Solomon Islands, somewhat resembles *P. quadriaurita* in habit. Its fronds, 2ft. to 3ft. long, are borne on strong, upright, yellowish-brown, polished stalks ; they are furnished on each side with numerous leaflets, which are cut down throughout nearly to the rachis into narrow-oblong, sickle-shaped lobes, with a similar but smaller one at the base on the lower side, all being of a soft, papery texture, and naked on both sides. The spore masses fall short of the

extremity of the lobes. *P. tripartita* is another name for this species.—*Hooker*, *Species Filicum*, ii., p. 226, t. 138B. *Nicholson*, *Dictionary of Gardening*, iii., p. 243. *Beddome*, *Ferns of Southern India*, t. 220.

P. moluccana—mol-uc-ca′-na (Moluccan), *Blume.*

This strong-growing, stove species, native of Malaysia, is a very distinct and ornamental Fern. Its ample fronds, borne on strong, polished, dark brown stalks, are 2ft. to 3ft. long, elegantly pendulous, and once divided to the midrib into numerous leaflets, which are disposed in opposite pairs. They are 1ft. to 1½ft. long, ½in. to ¾in. broad, wedge-shaped at the base, and finely toothed towards their point; their texture is somewhat leathery, their colour bright green on both surfaces, and they are of a shining nature. The spore masses are covered by a narrow involucre of a parchment-like texture.—*Hooker*, *Species Filicum*, ii., p. 158, t. 112B. *Nicholson*, *Dictionary of Gardening*, iii., p. 243.

P. mutilata—mut-il-a′-ta (mutilated), *Linnæus.*

This stove species, native of the West Indian Islands, is very distinct. Its fronds, either barren or fertile, are deltoid (in shape of the Greek delta, Δ), about 6in. each way, with a narrow, entire point and several entire leaflets cut into narrow leafits on each side. The barren fronds are borne on slender, naked, straw-coloured stalks 5in. to 6in. long; while the stalks of the fertile ones are stouter and 9in. to 12in. long. The divisions of the barren fronds are shorter and broader than those of the fertile ones, not toothed, but abruptly pointed at their extremity, and furnished with a crisp, white border of a tough, gristly nature. Both kinds are naked and shining on both surfaces. The spore masses are covered by a narrow, parchment-like involucre.—*Hooker*, *Species Filicum*, ii., p. 164, t. 131A. *Nicholson*, *Dictionary of Gardening*, iii., p. 243.

P. m. concinna—con-cin′-na (neat), *Heward.*

In this variety the fronds are more compound than is usually the case in the typical species.

P. nemoralis—nem-or-a′-lis (grove-loving). According to Baker, the plant known in gardens under this name is not distinct from *P. biaurita.*

P. nitida—nit′-id-a (bright), *Mettenius.*

A very distinct, stove species, of small dimensions, native of the banks of the Gaboon, West Africa, and readily distinguished through the wide-creeping, slender rhizome from which its fronds are produced. These fronds are deltoid (in shape of the Greek delta, Δ), 9in. to 12in. long, and four times divided nearly to the midrib; their lower leaflets, much the largest, are stalked, deltoid, and have the lower leafits on the lower side abundantly produced. The ultimate lobes are oblong, blunt at the extremity, and wedge-shaped at the base; they are of a thin but firm texture, naked on both surfaces, and of a bright green colour. The sori (spore masses) do not reach either the tip or the base of the lobes, and they are covered by a narrow, smooth involucre of a peculiar grey colour.—*Hooker*, *Species Filicum*, p. 479.

P. (Doryopteris) nobilis—Dor-ў-op′-ter-is; no′-bil-is (noble), *J. Smith.*

This very handsome, stove species, also known in gardens under the names of *P. elegans* and *Litobrochia grandis*, is a native of Southern Brazil. Its fronds, borne on naked, wiry stalks 1ft. or more in length, vary considerably as regards both size and shape, according to the age of the plant. In its young state it produces only single, heart-shaped fronds; but those eventually produced are halbert-shaped and finally somewhat palmate in form, with the terminal and the upper lateral leaflets entire, and the lower lateral ones divided into two or four spear-shaped leafits on their lower side. It then forms a beautiful object, as the fronds, thick and of a very leathery texture, are of a bright green colour, and their centre, as well as that of their leaflets and leafits, is ornamented with a broad band of white, more intense in the middle and gradually fading towards the edges. The spore masses form a continuous line extending from the base to the tip of the divisions.—*Hooker*, *Synopsis Filicum*, p. 167.

P. novæ-caledoniæ—nov′-æ–cal-e-do′-nĭ-æ (from New Caledonia), *Hooker.*

Referring to this gigantic-growing, stove species, which is of little decorative value, Mr. Charles Moore, of Sydney, who discovered it, states that the fronds are sometimes 10ft. in height; in some specimens, the lower leaflets, which measure nearly 1ft. in length and 9in. in breadth, have five large leafits on each side.—*Hooker*, *Species Filicum*, ii., p. 189.

P. (Doryopteris) ornithopus — Dor-ў-op′-ter-is ; or-ni′-thop-us (bird's-foot-like), *Mettenius.*

This is a very pretty, stove species, of small dimensions, native of Southern Brazil. It much resembles the better-known *P. palmata* as regards texture and venation, but essentially differs from that popular species in having on the fertile fronds several narrow segments like the claws of a bird, radiating from an undivided centre.—*Hooker*, *Synopsis Filicum*, p. 166.

P. Ouvrardi—Ouv-rar′-di (Ouvrard's). A form of *P. cretica.*

P. paleacea—pal-ĕ-a′-cĕ-a (scaly), *Roxburgh.*

A very strong-growing, stove species, of little decorative value, native of St. Helena, in the upper exposed part of Diana's Peak. Its fronds, 1ft. or more each way, are borne on strong, erect stalks 2ft. to 4ft. long, of a reddish-brown colour, and clothed throughout with large, brown scales.—*Hooker*, *Species Filicum*, ii., p. 186. *Nicholson*, *Dictionary of Gardening*, iii., p. 243.



Fig. 80. Portion of Mature Fertile Frond of Pteris palmata
(½ nat. size).

P. (Doryopteris) palmata — Dor-ў-op′-ter-is ; pal-ma′-ta (hand-shaped), *Willdenow.*

This small, stove species, also known in gardens as *Doryopteris collina*, is very distinct and deservedly popular, being of easy culture and of great decorative value. It is a native of Tropical America, its habitat extending from the West Indies and Colombia southward to Peru and Rio Janeiro ; and, according to Lowe, its introduction into the Royal Gardens, Kew, dates from 1840. Its fronds, which are of two distinct forms, are abundantly produced from a thick, fleshy crown. The barren ones, which measure about 4in. across, are composed of five or more triangular lobes, of which the terminal one is the largest ; they are borne on chestnut-brown, polished stalks only about 4in. long. The fertile fronds are borne on stalks sometimes 1ft. long ; they have the same hand-shaped outline, but they are cut down to a broadly-winged centre into narrow lobes of which the upper

ones are entire, and the lower ones again cut on the lower side (Fig. 80). All are of a thick, leathery texture, dark green in colour, and naked on both sides. The spore masses extend to the point of the lobes or segments. —*Hooker*, *Synopsis Filicum*, p. 166; *Garden Ferns*, t. 22. *Nicholson*, *Dictionary of Gardening*, iii., p. 244. *Lowe*, *Ferns British and Exotic*, iii., t. 37.

P. palmata possesses the peculiarity of reproducing itself from bulbils borne at the top of the stalk, just at the point of junction with the leafy portion. The quickest way of propagating it in quantities is by means of spores, which are freely produced; yet the bulbils will, if pegged down on the ground without being severed from the parent plant, make young plants in a very short time.

Although great quantities of this interesting species are grown annually, it is subject to very little variation. The only form deserving special attention is a variegated one sent to us by its raiser, Mons. Arthur van den Heede, of Ghent, who has himself named it *Doryopteris palmata argenteo-striata*. It partakes of all the characters and decorative qualities of the species, from which it is distinct through the numerous and conspicuous white stripes with which its fronds are ornamented.

P. Pancheri—Pan′-cher-i (Pancher's), *Baker*.

A stove species, of medium dimensions and little decorative value, with simply-pinnate fronds 2ft. to 2½ft. long, including the smooth, straw-coloured stalks. It is a native of New Caledonia.—*Hooker*, *Synopsis Filicum*, p. 479.

P. (Campteria) patens—Camp-te′-rĭ-a; pat′-ens (spreading), *Hooker*.

This stove species, also known in gardens under the name of *P. decussata*, is a native of Ceylon, Borneo, and the Philippine Islands. It is of large dimensions, its ample fronds, 3ft. to 4ft. long and 2ft. or more in breadth, being borne on upright, glossy, chestnut-brown stalks 1ft. or more in length. They are composed of a terminal leaflet 6in. to 9in. long, with several narrow-linear lobes on each side, the barren ones slightly toothed, and of numerous lateral leaflets, similar but larger, sometimes 1½ft. long, the lowest forked. All are of a somewhat leathery texture and naked on both sides. The spore

masses extend nearly to the end of the segments.—*Hooker*, *Species Filicum*, ii., p. 177, t. 137. *Nicholson*, *Dictionary of Gardening*, iii., p. 244. *Beddome*, *Ferns of Southern India*, t. 205.

P. (Doryopteris) pedata—Dor-ў-op′-ter-is ; ped-a′-ta (footed), *Linnæus.*

This pretty, dwarf-growing, stove species, native of the West Indies and Brazil, closely resembles *P. palmata*, from which, however, it is readily distinguished by its smaller size, as well as by its decidedly three-parted fronds, which are never proliferous.—*Hooker*, *Filices Exoticæ*, p. 34. *Nicholson*, *Dictionary of Gardening*, iii., p. 244. *Lowe*, *Ferns British and Exotic*, iii., t. 35.

P. pellucens—pel-lu′-cens (pellucid). Synonymous with *P. longipes.*

P. pellucida—pel-lu′-cid-a (pellucid), *Presl.*

This stove plant, native of Malaysia, the Philippine Islands, and the Guinea Coast, although in the typical state different from *P. cretica*, is not considered by Baker as specifically distinct.—*Hooker*, *Species Filicum*, ii., p. 161, t. 129B. *Beddome*, *Ferns of Southern India*, t. 38.

P. (Litobrochia) podophylla—Li-tob-roch′-ĭ-a ; pod-oph-yl′-la (having foot-like fronds), *Swartz.*

This is a strong-growing, stove species, native of Mexico and the West Indies. Its ample and three times divided fronds are borne on straw-coloured, glossy stalks, and are 4ft. or more in length. Their terminal leaflet, 6in. long or more, is cut down two-thirds of the way to the rachis into numerous narrow-sickle-shaped lobes, which are finely toothed when barren. The lateral leaflets, disposed in closely opposite pairs, are furnished with numerous lobes similar to those of the terminal one ; they are of a thick texture and naked on both surfaces, and the spore masses fall short of the point of the lobes.—*Hooker*, *Species Filicum*, ii., p. 227 ; *Garden Ferns*, t. 55. *Nicholson*, *Dictionary of Gardening*, iii., p. 244.

P. (Litobrochia) pulchra—Li-tob-roch′-ĭ-a ; pul′-chra (fair), *Schlechtendahl.*

This greenhouse species is a native of Mexico, where it is said to be found up to 5000ft. elevation. Its ample fronds are furnished on each side with

numerous stalkless, narrow leaflets, which are 4in. to 6in. long, about ¾in. broad, slightly toothed towards the point, of a leathery texture, and naked on both surfaces. The spore masses do not extend to the point of the leaflets.—*Hooker*, *Species Filicum*, ii., p. 213

P. pungens—pun′-gens (prickly), *Willdenow.*

A strong-growing, stove Fern, closely resembling *P. quadriaurita*, from which species it is distinguished only by the prickly character of its stalks. It is a native of the West Indies.—*Hooker*, *Species Filicum*, ii., p. 182. *Nicholson*, *Dictionary of Gardening*, iii., p. 244.

P. quadriaurita—quad-rĭ-au-ri′-ta (four-eared), *Retz.*

This species, which thrives in the cool and the warm house alike, possesses a very wide range of habitat, and is accordingly very variable in habit and in dimensions. It is found all round the world within the Tropics, and a little beyond them. Its fronds vary from 6in. to 2ft. or 3ft. in length and from 4in. to 12in. in breadth ; they are borne on naked or slightly rough, straw-coloured stalks usually 1ft. to 2ft. long, and consist of a terminal leaflet cut down nearly to the rachis into numerous close, parallel, narrow-oblong lobes, and of several pairs of lateral leaflets 6in. to 12in. or more in length, the lowest usually compound, with one or two similar but smaller leafits branching from them at the base on the lower side. The texture of the fronds is somewhat leathery, and they are naked on both surfaces. The sori (spore masses) are often continuous along the whole margin of the segments.—*Hooker*, *Species Filicum*, ii., p. 179, t. 134B. *Nicholson*, *Dictionary of Gardening*, iii., p. 244. *Beddome*, *Ferns of Southern India*, t. 30.

Among the many variations which have been observed in this species the most striking are the following :

P. q. argyræa—ar-gyr-æ′-a (silvery), *Moore.*

A very handsome and deservedly popular Fern, introduced from Central India. Its fronds, including the stalks, often attain 4½ft. or 5ft. in length and 2½ft. in breadth. The leaflets, which end in a tail-like point, and their leafits, which are usually blunt, are regularly adorned in their centre with a broad band of purest white, which forms a most pleasing contrast

with the bright green colour of the other parts of the plant (Fig. 81).—*Lowe, New and Rare Ferns*, t. 10. *Nicholson, Dictionary of Gardening*, iii., p. 244.

P. q. felosma—fel-os′-ma (heavy-scented), *J. Smith.*

A strong-growing variety, introduced from Jamaica in 1822. It differs from the species in its finer-cut foliage, which is of a dull green colour and has a strong and peculiar scent.—*Lowe, Ferns British and Exotic*, iv., t. 2. *Nicholson, Dictionary of Gardening*, iii., p. 244.



Fig. 81. Pteris quadriaurita argyræa much reduced).

P. q. sulcata—sul-ca′-ta (furrowed), *Link.*

This variety somewhat resembles *P. q. felosma* in general appearance, though of much dwarfer habit and destitute of the strong odour which characterises that variety. It was introduced from Jamaica into the Royal Gardens, Kew, in 1841. Its fronds, which seldom exceed 3ft. in length,

including their stalks, are of a deep green colour and smooth on both sides. —*Lowe*, *Ferns British and Exotic*, iv., t. 5. *Nicholson*, *Dictionary of Gardening*, iii., p. 244.

P. reginæ—re-gi′-næ (Queen's). This and *P. r. cristata* are sub-varieties of *P. ensiformis.*

P. rugulosa—rug-ul-o′-sa (slightly wrinkled), *Labillardière.*

A stove species, native of New Caledonia, producing from a wide-creeping rhizome its ample fronds, which are four times divided nearly to the midrib and furnished with closely-set, short-stalked, spear-shaped leaflets less than 1ft. long. The leaflets are again divided into close and almost stalkless, spear-shaped leafits, and these are in their turn cut into segments that are wedge-shaped on the lower side at the base, the lowest being deeply cleft into oblique, blunt lobes. The fronds are of a somewhat leathery texture, dull green in colour, and finely wrinkled, especially below. The edge of the fertile segments is revolute, and the spore masses reach to the midrib.—*Hooker*, *Synopsis Filicum*, p. 480.

P. sagittata—sag-it-ta′-ta (arrow-shaped). This is synonymous with *Pellæa sagittata.*

P. (Doryopteris) sagittifolia—Dor-ў-op′-ter-is; sag-it-tif-ol′-ĭ-a (arrow-fronded), *Raddi.*

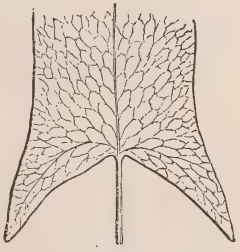


Fig. 82. Lower Portion of Frond of Pteris sagittifolia (½ nat. size).

This very pretty and thoroughly distinct, dwarf-growing, stove species is a native of Brazil, and, according to Lowe, was introduced into the Royal Gardens, Kew, in 1841. Its sagittate (arrow-shaped) fronds, 4in. to 6in. long from the top of the stalk to their extremity and 2in. to 3in. broad, are borne on naked, blackish stalks 4in. to 6in. long and of a polished nature ; they are entire, but furnished with two basal lobes which are triangular and sharp-pointed (Fig. 82 and Coloured Plate), as is the extremity of the frond itself. These fronds, of a leathery texture, are mostly fertile, and the spore masses, which form a continuous line all round the margin, are furnished with a narrow indusium.—*Hooker*, *Filices Exoticæ*, t. 39. *Nicholson*, *Dictionary of Gardening*, iii., p. 244. *Lowe*, *Ferns British and Exotic*, iii., t. 36.

P. (Pæsia) scaberula—Pæs′-ĭ-a ; scab-er′-ul-a (slightly rough), *Richard.*

This exceedingly pretty, compact-growing, greenhouse species, native of New Zealand, is of such totally distinct appearance that, to the casual observer, it appears much more like a finely-cut Davallia than a Pteris. The plant is provided with wide-creeping rhizomes of a wiry nature, from which its spear-shaped and finely-divided fronds, borne on somewhat rough stalks 6in. to 12in. long, are produced. These fronds are tri- or quadri-pinnatifid (three or four times divided nearly to the midrib), 1ft. to 1½ft. long, and 6in. to 9in. broad ; their lower leaflets are cut down to the rachis into numerous leafits on each side (Fig. 83), which are again cut down into oblong, toothed segments of a somewhat leathery texture and of a pleasing pale green colour. The abundant spore masses occupy, when mature, nearly the whole of the fertile segments, except the midrib.—*Hooker*, *Species Filicum*, ii., p. 174, t. 93A. *Nicholson*, *Dictionary of Gardening*, iii., p. 244. *Lowe*, *Ferns British and Exotic*, iv., t. 10.



Fig. 83. Pinna of Pteris scaberula (½ nat. size).

P. scabra—scab′-ra (rough), *Bory.*

A stove species, which, although very distinct, is of little decorative value. Its fronds, 2ft. or more in length and 1ft. to 1½ft. broad, are borne on strong, upright, dark chestnut-brown, glossy stalks 1ft. to 2ft. long ; they are composed of a terminal leaflet and several pairs of lateral ones, of such a leathery texture that the specimens can scarcely be fastened down on paper. It is a native of Mauritius and Bourbon.—*Hooker*, *Species Filicum*, ii., p. 187, t. 138A.

P. semipinnata—se-mip-in-na′-ta (half-pinnate), *Linnæus.*

This singular-looking, upright, greenhouse species, of medium dimensions, is a native of Hong-Kong, Japan, the Philippine Islands, and Borneo, and is also found on the Himalayas at an elevation of 4000ft. Its curious, broadly spear-shaped fronds, 1ft. to 1½ft. long and 6in. to 9in. broad, are of a peculiarly upright habit and borne on strong, erect, bright chestnut-brown, shining stalks 1ft. or more in length. Their upper part is cut down nearly to the rachis

into numerous closely-set, entire lobes, their lower two-thirds being provided with six or eight pairs of opposite leaflets, the largest of which are 3in. to 6in. long, with a long, narrow, entire point, and a broad, entire wing on the upper side of the midrib, but with several leafits 1in. to 2in. long on their lower side (Fig. 84). Their texture is scarcely leathery, the barren segments or leafits are finely toothed, and they are smooth on both surfaces. The spore masses, disposed in a continuous line from the base of the leafits, fall short of their extremity.—*Hooker*, *Species Filicum*, ii., p. 169; *Garden Ferns*, t. 59. *Nicholson*, *Dictionary of Gardening*, iii., p. 245. *Lowe*, *Ferns British and Exotic*, iv., t. 9. *Beddome*, *Ferns of Southern India*, t. 34.



Fig. 84. Lowest Pinna of Pteris semipinnata (nat. size).

P. serrulata—ser-rul-a′-ta (saw-edged), *Linnæus*.

Probably this is the commonest and best-known of all the species in the genus; but it is also the most useful for house and Fernery decoration, its elegant habit, easy cultivation, and lasting qualities rendering it especially adapted for that purpose. It is essentially a greenhouse Fern, requiring neither care nor trouble in its management, and is a native of China, where it is very common; it has also been received from Japan, and Eaton states ("Ferns of North America," vol. ii., p. 240) that in North America, where it is called the "Chinese Brake," it is found on shaded banks of rivulets in forests near Mobile, Alabama, and on walls in the city of Charleston, in South Carolina. According to Lowe, this useful species was introduced into England in 1770. Its slender fronds, 9in. to 18in. long and 6in. to 9in. broad, are borne on naked, pale brownish stalks 6in. to 9in. long and of a wiry nature. Their main rachis (midrib of the leafy portion) is margined with a wing which grows gradually narrower downwards and forms the terminal leaflet at the summit of the frond. The lateral leaflets are disposed in six or more pairs, usually, but not regularly, opposite; the upper ones are simple and 4in. to

6in. long, while the lower ones are provided with several long, narrow leafits on each side; the edge of the barren ones is conspicuously saw-toothed, and the fertile ones show a narrow involucre of a parchment-like texture covering the spore masses.—*Hooker*, *Species Filicum*, ii., p. 167. *Nicholson*, *Dictionary of Gardening*, iii., p. 245. *Lowe*, *Ferns British and Exotic*, iii., t. 40. *Eaton*, *Ferns of North America*, ii., t. 78.

Pteris serrulata is extremely variable, and through its variations it is brought into close connection with *P. cretica*. Although some of the numerous varieties produced by cultivation are not of sufficient interest to deserve special notice, and are only found to be distinct from one another when submitted to close comparison, there are other forms which are thoroughly distinct either in habit, size, or general appearance. Cristation is the form of variation which, as a rule, is most noticeable, though there are some others, and it is worthy of notice that most of the varieties thus obtained possess the power of reproducing themselves true from their spores. The following are the most distinct forms known:

P. s. angustata—an-gus-ta′-ta (narrow), *Moore*.

In this variety, of very elegant habit, the fronds have their leaflets narrower than those of the species; they are of a peculiar light green colour, of dimensions about equal to those of the typical plant, finely toothed throughout, and terminate in loose, narrow tassels.—*Nicholson*, *Dictionary of Gardening*, iii., p. 245.

P. s. Applebyana—Applĕ-bў-a′-na (Appleby's), *Moore*.

The fronds of this variety are long, much branched, and pendulous; the narrow leaflets, also beautifully pendent, have their extremity furnished with a much-divided and fringed, moss-like tassel. — *Nicholson*, *Dictionary of Gardening*, iii., p. 245.

P. s. corymbifera—cor-ymb-if′-er-a (corymb-bearing), *Moore*.

The fronds of this very handsome variety generally reach from 1ft. to 1¼ft. in length; they are of a peculiarly erect habit, and all their leaflets, being much shortened, form dense, crisp, corymbiferous heads of a pleasing bright green colour.—*Nicholson*, *Dictionary of Gardening*, iii., p. 245.

P. s. cristata—cris-ta′-ta (crested), *Moore.*

This variety is very variable. Its fronds, instead of being lengthened into a terminal leaflet, have a more or less rounded form, produced through the



Fig. 85. Pteris serrulata cristata
(¼ nat. size).

cristation of the leaflets, which appear to be all of nearly equal length. The original *P. s. cristata* is of upright habit (Fig. 85), but many seedlings raised from it have a more or less drooping character.—*Nicholson, Dictionary of Gardening*, iii., p. 245.

P. s. c. compacta and **densa**—com-pac′-ta, den′-sa (compact, dense), *May*.

These sub-varieties differ from *cristata* principally in their close, dense habit and dwarf stature. The fronds of *densa* are particularly elegant through the crests of all the leaflets being very delicately fringed.

P. s. c. Dixoni—Dix′-on-i (Dixon's), *Moore*.

This sub-variety is readily distinguished from the others through its leaflets being much broader than those of the type, beautifully pendulous, and terminating in loose crests.

P. s. c. major—ma′-jor (greater), *Moore*.

Of all the sub-varieties raised from *P. serrulata*, this one, also known as the Chiswick variety, is undoubtedly the most beautiful. Its fronds frequently attain 3ft. in length including their stalks; they are of a strong, firm nature and of a very dark shining green colour. Although of exceptionally large dimensions and heavily weighted with large, conspicuous tassels at their extremity, they possess a remarkably fine habit, and the entire plant has the appearance of an elegant vase of verdure. Although mock-fertile fronds are produced in abundance, this sub-variety is barren, and can therefore only be propagated by the division of the crowns.

P. s. c. parvula—par′-vul-a (small), *Schneider*.

A plant of very dwarf habit. Its short, stiff, erect fronds, seldom more than 10in. high including the stalks, have all their leaflets densely crested, and form a subject of unique appearance.

P. s. c. semifastigiata — se-mif-as-ti-gĭ-a′-ta (slightly fastigiate or pyramidal), *Moore*.

The growth of this very distinct plant is compact and upright. Its fronds have their lower portion developed as in the normal form, but their summit forms a large and broadly-crested corymb of a crisp nature and of a pleasing bright green colour.—*Nicholson, Dictionary of Gardening*, iii., p. 245.

P. s. gloriosa—glo-rĭ-o′-sa (glorious), *May*.

This is much in the way of *P. s. cristata major*, but of a more pendulous habit; the cristation is also of a finer nature, each leaflet being many times

divided at its summit and each division terminating in a deeply-cut or fimbriated, fan-shaped crest.

P. s. gracilis—grac′-il-is (slender), *May.*

A compact and very distinct variety. Its slender, arching fronds, which are of the same length as those of the typical *P. serrulata*, are furnished with very narrow leaflets, which do not show any signs of cristation, but are of a most elegant outline.

P. s. Leyi—Ley′-i (Ley's), *Moore.*

Of all the freaks of nature in connection with *P. serrulata*, this variety is undoubtedly the most extraordinary. Its fronds, of normal size, are of upright habit, and their leafy portion is reduced to a broad wing which runs along the rachis and for about 1in. at the base of the leaflets. The leaflets are reduced to a narrow, thread-like process 2½in. to 4in. long, curved upwards and very elegant. This curious plant reproduces itself true from the spores, which are disposed on the margins of the broad wing *only*, the other parts of the leaflets never showing any sign of fructification. It frequently happens that among seedlings of it plants with more or less crested fronds are found, and this character is retained, though it hardly adds to the beauty of the subject.

P. s. polydactyla—pol-yd-ac′-tyl-a (many-fingered), *Moore.*

This variety, which is normal as far as size and habit are concerned, has all the points of its leaflets several times forked and frequently much lengthened out.—*Nicholson, Dictionary of Gardening*, iii., p. 245.



Fig. 86. Pteris serrulata tenuifolia, showing Habit and portion of detached Frond

(Habit, ⅛ nat. size; Portion of Frond, nat. size).

P. s. tenuifolia—ten-ŭ-if-ol′-ĭ-a (slender-fronded), *Moore.*

Although the foliage of this light and graceful form is as fine and as elegant as that of *P. s. gracilis*, the plant itself differs considerably from that

variety through its habit, which is quite distinct. Its fronds, instead of being arching, are almost or quite upright, and their leaflets, though quite as narrow as those of *gracilis*, are shorter and of a more rigid nature.—*Nicholson*, *Dictionary of Gardening*, iii., p. 245.

P. Smithiana—Smith-ĭ-a′-na (Smith's). A variety of *P. tremula*.

P. spinulifera — spi-nul-if′-er-a (spine-bearing). This is synonymous with *P. atrovirens*.

P. (Litobrochia) splendens — Li-tob-roch′-ĭ-a ; splen′-dens (shining), *Kaulfuss*.

A strong-growing, stove species, native of Brazil, with ample fronds borne on erect, dull, slightly rough stalks. These fronds are divided to the midrib into numerous narrow, almost stalkless leaflets 1ft. or more in length, 1in. broad, and sharply toothed towards their extremity ; they are of a leathery texture and naked on both sides. The spore masses, which fall short of the point of the leaflets, ultimately hide the narrow involucre which at first covers them.—*Hooker*, *Species Filicum*, ii., p. 211.

P. Stelleri—Stel-le′-ri (Steller's). The plant usually found in gardens under this name is synonymous with *Pellæa gracilis*.

P. straminea—stra-min′-ĕ-a (straw-coloured), *Mettenius*.

This greenhouse species, of medium dimensions, also known in gardens under the name of *P. crispa*, is a native of Chili. Its fronds, which somewhat resemble a congested form of the popular *P. tremula*, are 1ft. to 1½ft. long and are borne on straw-coloured stalks of the same length. The leaflets occupy an ascending position ; the lowest, much the largest, are furnished on both sides with leafits, the lowest of which are again divided ; the others are cut down to a narrow wing along the rachis into spear-shaped segments, narrowed to a point, and sharply but closely toothed. The fronds are of a bright green colour, and their spore masses fall short of the point of the segments.—*Hooker*, *Synopsis Filicum*, p. 479. *Nicholson*, *Dictionary of Gardening*, iii., p. 245.

P. sulcata—sul-ca′-ta (furrowed). A variety of *P. quadriaurita*.

P. tremula—trem′-ul-a (trembling), *R. Brown.*

This strong-growing, greenhouse species, commonly called the "Australian Bracken," has, as much on account of its decorative qualities as through its excellent constitution, become a very popular Fern. It is also a native of New Zealand and Tasmania. Its ample fronds, 2ft. to 4ft. long and quite 2ft. broad, are borne on strong, upright, naked, bright chestnut-brown stalks 1ft. to 2ft. long. Besides the terminal leaflet, which consists of a few closely-placed, entire lobes, there are, according to the size of the fronds, from four to six pairs of lateral leaflets. The upper leaflets are simply pinnate, with entire leafits on each side, the largest being about 6in. long and more than 1in. broad; the lower ones are often very compound, sometimes 1ft. long, and twice divided to the midrib (Fig. 87). The fronds are of a soft, papery texture, bright green in colour, and naked on both sides. The abundant spore masses are of a pronounced reddish-brown colour and sometimes fill up the whole of the leafits except the midrib.—*Hooker*, *Species Filicum*, ii., p. 174, t. 120B. *Nicholson*, *Dictionary of Gardening*, iii., p. 245. *Lowe*, *Ferns British and Exotic*, iii., t. 45.



Fig. 87. Pinna of Pteris tremula (¼ nat. size).

Although this species is annually grown by hundreds of thousands for decorative purposes, it has produced comparatively few varieties of real merit. The following are all that are in cultivation at the present time:

P. t. elegans—e′-leg-ans (elegant), *May.*

In this variety, which is of smaller dimensions than the type, the lateral leaflets are forked or slightly crested at their extremity, while the fronds terminate in a crest of repeatedly-divided segments, the weight of which causes them to droop and gives the plant a light and elegant appearance.

P. t. flaccida—flac′-cid-a (weak), *May.*

In this variety, which is as free-growing as the type, the fronds have a bright, shining surface, their leaflets are narrower than those of the type, and the terminal leafits are much elongated and slightly twisted.

P. t. foliosa—fol-ĭ-o′-sa (leafy), *Schneider.*

This variety is readily distinguished from the species by its broader fronds, the leafits of which are rounder, much larger, and overlapping; also by the very pleasing pale green colour of the entire plant, which is of a denser habit.—*Nicholson, Dictionary of Gardening*, iv., p. 597.

P. t. grandiceps—gran′-dic-eps (large-headed), *May.*

The fronds of this form are of an elegantly-arching or somewhat drooping habit; their extremity consists of a large, flattish, finely-tasselled crest consisting of four or five principal divisions and numerous furcations. The leaflets and leafits also terminate in smaller crests.—*Nicholson, Dictionary of Gardening*, iv., p. 597.

P. t. Kingiana—King-ĭ-a′-na (King's), *Endlicher.*

This vigorous, noble-looking variety, of somewhat drooping habit, is a native of Norfolk Island, and, according to Lowe, was introduced into the Royal Gardens, Kew, in 1831, by Allan Cunningham. It differs from the species principally in its general habit and also in its segments being much larger (sometimes 1½in. long and nearly ¼in. broad), without being toothed. —*Lowe, Ferns British and Exotic*, iii., t. 46. *Hooker, Species Filicum*, ii., p. 188.

P. t. Smithiana—Smith-ĭ-a′-na (Smith's), *Smith.*

This is no doubt the most striking form of *P. tremula* that has been obtained from cultivation. Indeed it has very little outward resemblance to the typical plant, being of a dense, compact, upright, rigid habit. Its fronds, which attain 2ft. to 2½ft. in height including the stalks, are extremely irregular in their development: sometimes the whole frond consists of a large, multifid tassel, while in other cases there are a few lateral leaflets to each branching of the frond, and each one is terminated by a crest of a pleasing bright green colour.

P. t. variegata—var-ĭ-eg-a′-ta (variegated), *May.*

This variety, of much smaller dimensions than the type or any of the other known varieties, is beautifully and very distinctly marked with a white band running along the centre of the leaflets and leafits, and forming a very pleasing contrast with the bright green colour of their edges.

P. tricolor—tric′-ol-or (three-coloured). This is a variety of *P. aspericaulis.*

P. tripartita—trip-ar-ti′-ta (thrice-parted). Synonymous with *P. Milneana.*

P. umbrosa—um-bro′-sa (shady), *R. Brown.*

This very handsome, greenhouse species, native of New South Wales and Australia, was, according to Lowe, introduced into the Royal Gardens, Kew, in 1824. It is a tall, erect-growing plant, with fronds 1ft. to 2ft. long, 6in. to 12in. broad, and of a particularly drooping character. These fronds are borne on strong, reddish-brown stalks 1ft. to 1½ft. long, and are composed of a terminal leaflet and from six to nine pairs of lateral ones, all of which run down the stalk at the base, so as to form a broad wing which extends nearly or quite from the base of one leaflet to the next. In the barren fronds the leaflets have finely-toothed edges, while in the fertile ones they are narrower and smooth on the edge. The lowest leaflets in each frond are usually divided into from two to four leafits, but the others are entire; all are of an elegantly pendulous nature, leathery in texture, and dark shining green in colour. The spore masses are disposed in a continuous line extending to within 1in. of the point of the leaflets and leafits; they are green when young, afterwards of a conspicuous reddish-brown colour, and are turned back so as to cover the edges.—*Hooker*, *Species Filicum*, ii., p. 162, t. 130B. *Nicholson*, *Dictionary of Gardening*, iii., p. 245. *Lowe*, *Ferns British and Exotic*, iii., t. 39.

P. undulata—un-dul-a′-ta (wavy), *Moore.*

A very handsome, evergreen, stove Fern, native of Fiji, somewhat resembling *P. Endlicheriana;* it differs, however, in the undulated nature of the margins of its segments, which are also less pointed. The stalks, 1½ft. long, are of a dark chestnut-brown colour. The fronds, 2ft. long and 2ft. broad, are triangular and pinnate, with leaflets cleft more than half-way to the midrib and divided so as to leave a broad, wavy wing to the rachis. The

broad, undulating surface of the arching fronds gives them a distinct and very pleasing character. *P. areolata* is identical with this species.—*Moore, Gardeners' Chronicle*, 1867, p. 348. *Hooker, Synopsis Filicum*, p. 480.

P. (Litobrochia) vespertilionis — Li-tob-roch′-ĭ-a ; ves-per-ti-lĭ-o′-nis (bat-winged). Synonymous with *P. incisa.*

P. (Litobrochia) vestita—Li-tob-roch′-ĭ-a ; ves-ti′-ta (clothed), *Baker.*

A stove species, of medium dimensions, native of Peru, with fronds 1ft. to 2ft. long, borne on slender, upright stalks 1ft. or more in length, hairy when young, but smooth and straw-coloured later on. The terminal leaflet, 1ft. to 1¼ft. long and 2½in. broad, is cut down to a broadly-winged stalk into numerous sickle-shaped lobes ; the lateral leaflets resemble the terminal one, but are smaller and tail-like at the point ; all are of a soft texture and hairy on both surfaces. The spore masses, which are confined to the inner two-thirds of the leaflets, are covered with an involucre which consists principally of a dense fringe of strong hairs.—*Hooker, Synopsis Filicum*, p. 169.

P. Victoriæ—Vic-to′-rĭ-æ (Victoria's). A variety of *P. ensiformis.*

P. (Litobrochia) Vieillardi—Li-tob-roch′-ĭ-a ; Vieil-lard′-i (Vieillard's), *Mettenius.*

This stove species, native of New Caledonia, is very distinct, being the least-divided of the sub-genus. Its fronds, which are borne on erect, wiry, chestnut-brown stalks 6in. to 12in. long, are composed of a terminal leaflet 6in. long and 1in. broad, and of two smaller lateral ones ; they are of a leathery texture and naked on both sides. The spore masses extend to the extremity of the fronds.—*Hooker, Synopsis Filicum*, p. 167.

P. (Pæsia) viscosa—Pæs′-ĭ-a ; vis-co′-sa (clammy), *Moore.*

A stove species, native of Jamaica, Venezuela, and Peru, and provided with a wide-creeping rhizome densely clothed with narrow, dark brown scales. The fronds, produced on these rhizomes and borne on stalks 1ft. or more in length, are large and much divided. Their upper leaflets, small and spear-shaped, are pinnatifid (divided nearly to the midrib) ; the lower ones, 1ft. to 2ft. long and 6in. to 9in. broad, are furnished on each side with numerous spear-shaped leafits, which are cut down into deeply-lobed segments about



PTERIS REGINA CRISTATA

½in. long and ¼in. broad ; the texture of all is somewhat leathery, and they are densely clothed on both surfaces with viscid glands. The spore masses are covered with a double involucre of a parchment-like texture, the inner one being sometimes obsolete.—*Hooker*, *Species Filicum*, ii., p. 200, t. 121B.

P. (Campteria) Wallichiana—Camp-te′-rĭ-a ; Wal-lich-ĭ-a′-na (Wallich's), *Agardh.*

This is a very robust-growing, greenhouse species, native of Japan and the Himalayas, where it is said to occur at 8000ft. elevation. Its ample, thrice-divided fronds are borne on strong, bright chestnut-brown, glossy stalks 5ft. to 6ft. long. The central leaflet, often 2ft. long and 1ft. broad, is furnished on each side with many spear-shaped, stalkless leafits cut down nearly to the rachis into numerous narrow-oblong lobes nearly entire when barren ; the lateral leaflets, as large as the central one, are again forked ; all are of a soft, papery texture and pale green in colour. The spore masses are disposed along nearly the whole length of the leafits.—*Hooker*, *Species Filicum*, ii., p. 206. *Beddome*, *Ferns of British India*, t. 217.

PYCNOPTERIS—Pyc-nop′-ter-is. *See* **Nephrodium.**

RHIPIDOPTERIS—Rhi-pid-op′-ter-is. *See* **Acrostichum.**

RHIZOGLOSSUM—Rhi-zog-lōs′-sum. *See* **Ophioglossum.**

CHAPTER XII.

SADLERIA, *Kaulfuss.*

(Sad-ler′-ĭ-a.)

IN Hooker's "Synopsis Filicum" *Sadleria* forms Genus 35, occupying a position between *Blechnum* and *Doodia.* This genus, which was named in honour of Joseph Sadler, Professor of Botany at Perth, comprises but two species of stove Ferns of arborescent habit, only one of which—*S. cyatheoides*—has yet been introduced in our gardens. This is a very handsome plant, combining the habit of a small Cyathea with the fructification of a Blechnum. The distinguishing character of the genus resides in the disposition of the sori (spore masses), which form a continuous line close to the midrib on both sides, where they are placed on an elevated receptacle and covered with a narrow involucre of a somewhat leathery texture, at first wrapped over the spore masses, but afterwards spreading. The conspicuous veins in the leafits form a series of distinct costal arches.

Culture.

S. cyatheoides is a vigorous grower, requiring no special care, and thriving under warm treatment, in a mixture of two parts peat, one part loam, and one part silver sand, with abundance of moisture at all times of the year. It is usually propagated by means of spores, received from its native habitats, none of the cultivated plants having as yet shown signs of fructification.

S. cyatheoides—cy̆-ath-ĕ-ŏ-i′-dēs (Cyathea-like), *Kaulfuss.*

This handsome species (see Plate), of recent introduction in gardens, is a native of the Sandwich Islands and Sumatra. Its fronds, 4ft. to 6ft. long and 9in. to 18in. broad, are borne on strong, upright stalks 6in. to 18in. long, naked except at the base, where they are densely clothed with long, narrow, light brown scales. The leaflets, 8in. to 12in. long and ½in. to ¾in. broad, are cut down to the rachis into numerous connected, narrow leafits, barely ½in. broad and somewhat bluntish at their extremity. The whole of the leafy portion of the frond is of a leathery texture and of a very pleasing light green colour. The plant is said to form a stem 3ft. to 4ft. high, but we are not aware that any of these stems have found their way to Europe, the specimens in commerce being home-raised seedlings.—*Hooker*, *Species Filicum*, iii., p. 65. *Nicholson*, *Dictionary of Gardening*, iii., p. 341.

S. squarrosa—squar-ro′-sa (scurfy), *Gaudichaud.*

This species, also native of the Sandwich Islands, is very different in habit from *S. cyatheoides* and of much smaller dimensions. Its fronds, 1ft. to 1½ft. long and 6in. broad, are borne on erect stalks 6in. to 8in. long, densely clothed with rough scales of a reddish-brown colour. They are furnished with twelve to eighteen pairs of narrow-spear-shaped leaflets, 3in. to 4in. long, ½in. to ¾in. broad, cut down to the rachis into quite distinct, oblong-sickle-shaped leafits of a dark green colour and leathery texture. The spore masses are disposed in shorter rows, and these are also situated farther from the midrib, than in *S. cyatheoides.*—*Hooker*, *Synopsis Filicum*, p. 187.

SAGENIA—Sag-e′-nĭ-a. *See* **Nephrodium.**

SALPICHLÆNA—Sal-pich-læ′-na. *See* **Blechnum.**

SCHAFFNERIA—Schaff-ner′-ĭ-a. *See* **Scolopendrium.**

CHAPTER XIII.

SCHIZÆA, *Smith.*

(Schiz-æ′-a.)

Comb or Rush Ferns.

THE name of this small, widely-diffused genus, composed of plants totally distinct in habit from all other known Ferns, is derived from *schizo*, to split, in allusion to the fan-shaped or multifid nature of the fronds of most species. In Hooker's "Synopsis Filicum" *Schizæa* forms Genus 64, and comprises plants with fronds terete (cylindrical) or nearly so, with pinnate fertile segments and biserial capsules; others with fronds distinctly flattened, pinnate fertile segments, and biserial capsules; and a few with fertile segments digitate (hand-shaped) rather than pinnate and quadriserial capsules. The distinctive character of the genus, besides the peculiar appearance of the plants of which it is composed, lies in the nature of the fructification, which consists of sessile (stalkless), two-valved capsules opening down the side, disposed in either two or four rows covering one side of close, distichous (two-rowed) spikes which form separate fertile segments at the extremity of the fronds. The genus belongs to the sub-order *Schizæaceæ*, which also embraces the better-known genera *Anemia*, *Lygodium*, *Mohria*, and *Trochopteris*.

Schizæa has representatives in Cape Colony, New Zealand, various parts of Australia, North and South America, and the West Indies, where they are usually found growing in marshy places, but exposed to the action of light—a circumstance which may easily be accounted for by the rush-like nature of their fronds.

Culture.

On account of the difficulties with which their culture is beset, Schizæas are seldom met with in general collections; yet some of the species are well worth a little extra attention. It may be useful to note that where they are found to thrive under cultivation they are invariably grown in a compost of roughly-broken peat and loam, in about equal parts, with ample drainage; for, although growing naturally in swampy places, they, under culture, greatly dislike stagnant water, though they require frequent and copious waterings at the roots. A position where they are under the influence of ventilation is also beneficial. We have never heard of an instance of Schizæas being raised from spores, although these have frequently been received in England, especially from Australia.

Principal Species.

S. australis—aus-tra′-lis (Southern), *Gaudichaud.*

A small-growing, stove species, native of the Falkland and Auckland Islands, and of dense habit. Its very short, dark chestnut-brown stalks, channelled in front, pass gradually into the wiry, nearly cylindrical fronds, which are 1in. to 2in. long. The fertile segments, somewhat erect, show about six short, stout, nearly spreading spikes on each side.—*Hooker*, *Synopsis Filicum*, p. 428.

S. bifida—bif′-id-a (twice-cleft), *Swartz.*

This greenhouse species, native of New Zealand and Temperate and North Australia (whence it was introduced in 1822), is one of the most robust-growing, as also one of the most decorative, of the whole genus. Its chestnut-brown, dense stalks pass gradually into the fronds, which are 6in. to 18in. long, forked generally below the middle, sometimes forked again, casually simple; they are rush-like in texture and of a very wiry nature, with a prominent, rough midrib, and two narrow, thick wings. The fertile segments, somewhat erect or recurved, are unilateral (one-sided), showing from ten to twenty slender, upright spikes on each side.—*Hooker*, *Synopsis Filicum*, p. 429. *Nicholson*, *Dictionary of Gardening*, iii., p. 383.

S. dichotoma—dich-ot′-om-a (repeatedly forked), *Swartz.*

This is a stove species, native of Cuba, Venezuela, Peru, Australia, New Zealand, Malaysia, the Neilgherries, &c. The fronds, fan-like in general outline, 6in. to 9in. each way, and many times forked, are borne on firm, erect, glossy stalks 6in. to 18in. long, channelled on the face above. The fertile segments show from four to ten spreading spikes on each side.—*Hooker and Greville, Icones Filicum*, t. 17. *Nicholson, Dictionary of Gardening*, iii., p. 383.

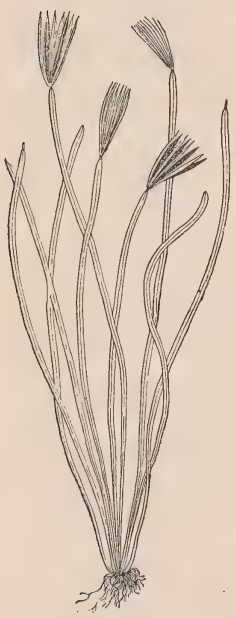


Fig. 88. Schizæa digitata (nat. size).

S. digitata—dig-it-a′-ta (hand-shaped), *Swartz.*

In this stove species, native of the Himalayas, Ceylon, and the Philippine, Malayan, and Fiji Islands, the stalks, brownish, and nearly cylindrical, pass gradually into the fronds, which are 2in. to 3in. long, flattened, with the midrib prominent beneath, and crowned at the summit with fertile spikes 1½in. long, naked beneath, with the capsules disposed in four rows and the edge much inflexed. Fig. 88 is reduced from Col. Beddome's "Ferns of Southern India," by the kind permission of the author.—*Hooker, Garden Ferns*, t. 54. *Nicholson, Dictionary of Gardening*, iii., p. 383. *Beddome, Ferns of Southern India*, t. 268.

S. elegans—e′-leg-ans (elegant), *Swartz.*

The habitat of this stove species extends from the West Indies and Mexico to Brazil, whence it was introduced in 1819. Its fronds, borne on firm, erect, naked stalks 6in. to 12in. long, are like the letter V in outline, 4in. to 8in. each way, and repeatedly forked or cleft, their divisions varying greatly in number and breadth. The fertile segments, distinctly stalked, show from six to fifteen close, spreading, narrow-cylindrical spikes on each side.—*Hooker, Garden Ferns*, t. 54. *Nicholson, Dictionary of Gardening*, iii., p. 383.

S. fistulosa—fis-tul-o′-sa (roundish and hollow), *Labillardière.*

A greenhouse species, native of Australia, Tasmania, New Zealand, and Chili. Its dense, chestnut-brown stalks pass gradually into the fronds, which

are 4in. to 12in. long, rigid, and rush-like; they are nearly round, being simply channelled in front. The fertile segments, somewhat upright and about 1in. long, show from ten to twenty close, slender spikes on each side.—*Hooker*, *Synopsis Filicum*, p. 429.

S. malaccana—mal-ac-ca′-na (Malaccan), *Baker.*

In this stove species, native of Malaysia and the Philippine Islands, and which, according to Beddome, grows at an elevation of 3500ft. on Mount Gedé, in Moulmein, the stalks are weak, flexuose, nearly cylindrical, and not distinguishable from the fronds themselves, which, whether barren or fertile, are similar. The fertile segments are erect, often disposed in two series, and show from three to six slender, spreading spikes on each side.—*Hooker*, *Synopsis Filicum*, p. 428. *Beddome*, *Ferns of British India*, t. 255.

S. pectinata—pec-tin-a′-ta (comb-like), *Smith.*

A greenhouse species, native of Cape Colony. Its very dense, chestnut-brown stalks pass gradually into the fronds, which are 4in. to 8in. long, rigid and rush-like in texture, with a broad, central midrib, and two narrow, thick, revolute edges. The fertile segments, nearly horizontal, show from ten to fifteen slender, vertical spikes on each side.—*Hooker*, *Synopsis Filicum*, p. 429.

S. penicillata—pe-nic-il-la′-ta (pencil-like). Synonymous with *S. pennula.*

S. pennula—pen′-nul-a (small-winged), *Swartz.*

This is a very distinct, stove species, native of the West Indies, New Caledonia, the Isle of Pines, and the Seychelles, and said to have been introduced in 1816. Its dense, brownish, somewhat cylindrical stalks, 1in. to 2in. long, pass gradually into the fronds, which are 1ft. or more in length, very thick, triquetrous (furnished with three sharp angles), and crowned at their summit with from six to twelve slightly three-angled, fertile spikes which are ½in. to 1½in. long, hairy beneath, with the capsules usually disposed in four rows.—*Hooker and Greville*, *Icones Filicum*, t. 54. *Nicholson*, *Dictionary of Gardening*, iii., p. 383.

S. pusilla—pus-il′-la (dwarf), *Pursh.*

This greenhouse species is essentially a native of North America, where it is commonly known as the "New Jersey Schizæa." According to Eaton, it

is found in the central and eastern counties of New Jersey, usually growing in the drier parts of sphagnous swamps, among White Cedars. Its curious little fronds are produced from a horizontal, creeping rootstock, bearing only a few barren and a few fertile ones. The latter, 3in. to 4in. long, are roundish, wiry, much contorted, and curled; the barren ones, much shorter, are also much twisted and slightly flattened. The fertile segments, of a somewhat erect habit, are unilateral, showing about six rather stout spikes on each side. This species is said to be hardy in the South of England.—*Hooker and Greville*, *Icones Filicum*, t. 48. *Nicholson*, *Dictionary of Gardening*, iii., p. 383. *Eaton*, *Ferns of North America*, t. 24.

S. robusta—ro-bus′-ta (robust), *Baker.*

Although much larger in all its parts than *S. australis*, this plant, native of the Sandwich Islands, is considered by Brackenridge as simply a tropical form of that species.—*Hooker*, *Synopsis Filicum*, p. 429.

S. rupestris—ru-pes′-tris (rock-loving), *R. Brown.*

A greenhouse species, of small dimensions, native of Temperate Australia, whence it was introduced in 1822. Its stalks, only about 1in. long and nearly cylindrical, pass gradually into the fronds, which are grass-like and flattened, almost fleshy in texture, 3in. to 4in. long, with a slender midrib. The fertile segments, solitary and somewhat upright, show from six to ten slender, spreading, toothed spikes on each side.—*Hooker and Greville*, *Icones Filicum*, t. 47. *Hooker*, *Garden Ferns*, t. 42.

S. Sprucei—Spru′-cĕ-i (Spruce's), *Hooker.*

This is a very distinct, stove species, discovered on the banks of the Rio Negro. Its fronds are produced from a somewhat upright rootstock of a woody nature and borne on firm, dense, erect stalks 9in. to 12in. long, clothed, especially below, with rough, brownish scales. They are very thick in texture, naked, 6in. to 8in. long, nearly ½in. broad at their widest part, narrowed gradually downwards, and bear at their summit from one to six long-stalked fertile segments 1½in. to 2in. long, with the rachis spirally recurved. The very numerous fertile spikes are woolly beneath.—*Hooker*, *Icones Plantarum*, t. 1016.

S. tenella—ten-el′-la (very delicate), *Kaulfuss.*

A greenhouse species, of medium dimensions, native of Cape Colony, with dense, chestnut-brown stalks passing gradually into the fronds, which are 6in. to 8in. long, not very rigid, with a broad, distinct midrib and two equal wings. The fertile segments, somewhat upright and nearly ½in. long, are unilateral, showing from four to eight rather stout spikes on each side.—*Hooker, Synopsis Filicum*, p. 428.

SCHIZOLOMA—Schiz-ol-o′-ma. *See* **Lindsaya.**

CHAPTER XIV.

SCOLOPENDRIUM, *Smith.*

(Scol-op-en′-drĭ-um.)

Hartstongue.

NICHOLSON, in his excellent and exhaustive "Dictionary of Gardening" (vol. iii., p. 393), tells us that *Scolopendrium* is the ancient Greek name of the genus used by Theophrastus, and that it was said to be so called because the numerous parallel lines of fruit resemble the feet of the centipede (*scolopendra*). The popular appellation, Hartstongue, is derived from the shape of the frond of the only British species, *S. vulgare.*

Scolopendrium, which in Hooker's "Synopsis Filicum" forms Genus 41 and represents the entire tribe *Scolopendrieæ*, contains only nine species, most of which, though existing in the form of dry specimens, are as yet unknown in gardens. In accordance with their various modes of venation, the species have been divided as follow :

Antigramme (An-tig-ram′-me), *Presl.* The fronds of the plants of this sub-genus have a distinct midrib, and their veins intercross each other towards the edge.

Camptosorus (Camp-tos-o′-rus), *Link.* In this sub-genus the fronds have their veins intercrossing each other near the midrib, but they are free outward. The sori (spore masses) are usually disposed in opposite pairs, but more or less divaricating (branching off at a high angle and spreading irregularly in various directions).

Euscolopendrium (Eu-scol-op-en′-drĭ-um), or true *Scolopendrium*, *Smith.* The fronds of the species in this division have their veins free or only casually intercrossing each other.

Schaffneria (Schaff-ner′-ĭ-a), *Fée.* The only species at present known belonging to this sub-genus has fronds with no distinct midrib, but veins flabellate (fan-shaped) and uniting towards the edge.

In their fructification the plants belonging to *Scolopendrieæ* are closely allied to those belonging to *Aspleniecæ.* Their sori are similar to those of the latter tribe, being attached to the veins, oblique with regard to the midrib, or occasionally almost parallel with it, linear or oblong. Their involucres (coverings), however, instead of being single and opening towards the midrib, are arranged in pairs and open towards each other.

The species of *Scolopendrium*, though not numerous, are widely distributed. One at least, *S. vulgare*, is a native of Great Britain as well as of some other parts of Europe, the United States of America, Japan, &c.; while another, *S. Hemionitis*, though not found in the United Kingdom, is a native of various parts of Southern Europe. *S. rhizophyllum*, or, as it is commonly called, the "Walking Fern," is essentially a North American plant; in *S. sibiricum* we have a Fern whose habitat extends from Siberia to Kamtschatka and Japan; while *S. nigripes*, *S. brasiliense*, and *S. plantagineum* are of South American origin, and even the Philippine Islands have produced *S. pinnatum.*

Culture.

On account of their extensive geographical distribution, Scolopendriums are adapted for either the stove, the greenhouse, or the hardy Fernery. The best-known and most extensively cultivated is undoubtedly the common Hartstongue, *S. vulgare*, of which an almost unlimited number of beautiful or merely curious forms are found in gardens. These, through the extremely varied nature of the outline of their foliage, present a wonderful series of interesting variations from the normal state of the plant. They thrive best in a compost of a light, sandy nature, made up of two parts leaf mould or peat, one part loam, and one part silver sand, and are particularly useful for growing by the edge of water or in shady places, where it is often difficult to cultivate other plants with success.

With the exception of the varieties of *S. vulgare*, which are usually and with greater certainty increased by the division of their crowns (and a few by means of the bulbils produced on their fronds), the propagation of Scolopendriums is effected by spores, which are abundantly produced and germinate freely.

Principal Species and Varieties.

S. (Antigramme) brasiliense—An-tig-ram′-me ; bras-il-ĭ-en′-sĕ (Brazilian), *Kunze.*

This stove species, which, according to Lowe, was introduced into the Royal Gardens, Kew, in 1836, is a native of Brazil. Its fronds, 6in. to 12in. long and 1in. to 1½in. broad, taper towards both ends and are borne on short, hairy stalks ; they are of a leathery texture and their veins intercross one another about two-thirds of the distance from the midrib to the edge. The spore masses are confined to the free veins.—*Hooker*, *Species Filicum*, iv., p. 3. *Lowe*, *Ferns British and Exotic*, v., t. 14B.

S. Douglasii—Doug-las′-ĭ-i (Douglas's). Synonymous with *S. plantagineum.*

S. Durvillei—Dur-vil′-lĕ-i (Durville's), *Bory.*

In this singular-looking species, native of Ualan, the fronds, which are produced from a firm, wide-creeping rhizome, and borne on firm, erect, naked stalks 2in. to 3in. long, vary from simple, oblong-spear-shaped, 6in. long, 1in. broad, with the edges notched and the base eared, to broadly triangular and twice divided half-way to the midrib, with several leaflets on each side cut down nearly to the rachis into narrow, toothed or pinnatifid lobes ; they are of a somewhat leathery texture and naked on both sides. The spore masses reach from the midrib two-thirds of the way to the edge without any raised line between them.—*Hooker*, *Synopsis Filicum*, p. 247.

S. Hemionitis—He-mĭ-on-ĭ′-tis (Hemionitis-like), *Swartz.*

A greenhouse species, popularly known as the "Mule's Fern" ; it is a native of Southern Europe, being found in the South of France, Italy, Spain, and the Mediterranean Islands, and is no doubt related to the common *S. vulgare*, but its fronds, borne on slender and slightly hairy stalks 4in. to

6in. long, are in the form of an arrow, distinctly heart-shaped at the base, with sometimes short and rounded, at other times prominent and almost sharp, lobes. Their texture is also thinner than that of *S. vulgare*, their veins are more branched, and their spore masses are much shorter. This species thrives best in a warm, sheltered situation in a shaded rockery.—*Hooker*, *Species Filicum*, iv., p. 2. *Nicholson*, *Dictionary of Gardening*, iii., p. 393. *Correvon*, *Les Fougères rustiques*, p. 123.

S. Krebsii—Krebs'-ĭ-i (Krebs'), *Kunze.*

This singular and very interesting, greenhouse species, by some authors placed in the genus *Lomaria*, of which it possesses only the outward appearance, is a native of Natal and the Cape of Good Hope. Its distinctly-pinnate fronds, 1ft. to 1½ft. long and borne on short stalks, are produced from a half-erect rootstock. They are broadly spear-shaped, with an abruptly-pointed extremity and numerous smooth, spreading leaflets of a leathery texture; these are about 3in. long, stalkless, spear-shaped, and heart-shaped above and below at the base. Every leaflet has a large number of parallel rows of sori directed from the midrib towards the edge at a sharp angle with the former.—*Lowe*, *Ferns British and Exotic*, v., t. 56. *Botanical Magazine*, t. 4768.

S. (Schaffneria) nigripes — Schaff-ner'-ĭ-a; nig'-rip-ēs (black-footed), *Hooker.*

A stove species, native of Mexico and Guatemala, with ovate or roundish fronds 1in. to 1½in. broad, of a thick, leathery texture, borne on black, polished stalks 1in. to 2in. long and jointed at the summit. The spore masses are disposed in irregular, linear or oblong patches.—*Hooker*, *Synopsis Filicum*, p. 247.

S. officinarum — of-fic-i-na'-rum (officinal). This and *S. officinale* are synonymous with *S. vulgare.*

S. pinnatum—pin-na'-tum (once-divided), *J. Smith.*

The fronds of this stove species, native of the Philippine Islands, are borne on compressed, greyish stalks, and are 2ft. to 4ft. long. They are composed of an entire, terminal leaflet 4in. to 6in. long, 1½in. to 2in. broad,

and proliferous at its extremity, and of from one to six pairs of similar lateral ones, of a somewhat leathery texture. The spore masses, ½in. to ¾in. long, are disposed in oblique lines.—*Hooker*, *Species Filicum*, iv., p. 2. *Nicholson*, *Dictionary of Gardening*, iii., p. 393.

S. (Antigramme) plantagineum—An-tig-ram′-me ; plan-ta-gin′-ĕ-um (Plantago-like), *Schrader*.

A stove species, also known as *S. Douglasii*, native of Brazil. Its egg-shaped fronds, 6in. to 10in. long and 3in. to 5in. broad, are either rounded or heart-shaped at the base, with the edge entire, and are borne on firm, grey, naked stalks 6in. to 9in. long ; their texture is leathery and their veins intercross each other within about ½in. of the edge. The spore masses are confined to the free veins.—*Hooker*, *Species Filicum*, iv., p. 3. *Hooker and Greville*, *Icones Filicum*, t. 150.

S. (Camptosorus) rhizophyllum — Camp-tos-o′-rus ; rhi-zoph-yl′-lum (having rooting fronds), *Hooker*.

This singular, greenhouse species, popularly known as the "Walking Fern" or the "Walking Leaf" of America, seems to be a species long known in England, as, according to Lowe, it had probably been introduced as early as 1680. Eaton, in his excellent work, "Ferns of North America," states that it occurs in many places in Western New England, but that it is rare in the East ; also that it is common from Canada to Virginia, Alabama, Wisconsin, and Kansas, where it is generally found in patches of considerable extent, growing on mossy rocks, especially on those of a limestone nature, which it prefers, and in the crevices of which the finest specimens are usually found firmly rooted. Probably the earliest notice of the Walking Leaf is in Ray's "Historia Plantarum," vol. ii., p. 1927, published in 1688. It is there described as "*Phyllitis parva saxatilis per summitates folii prolifera.*" Other early accounts of this singular plant may be found in the "Species Plantarum" of Linnæus and of Willdenow, and in the second edition of Gronovius's "Flora Virginica."

The whole plant consists of a few fronds, growing from the end of a very short yet creeping rootstock, and supported on slender, naked, chestnut-brown stalks 1in. to 4in. long. Their leafy portion, 4in. to 9in. long and

comparatively narrow, rarely rises erect, but is usually decumbent. The wings of the stalks widen out into a wedge-shaped base which is sunk between two basal auricles (ear-like appendages). These auricles are scantily developed in small fronds, but in larger ones they are more or less prominent, making the base of the frond either heart-shaped or halbert-shaped. In some specimens the auricles are drawn out into slender points as much as 4in. long. The upper part of the frond is scarcely wider than the stalk and commonly produces at the extremity a proliferous bud, which very frequently takes root and develops into a new plant (Fig. 89). The fronds are of a leathery

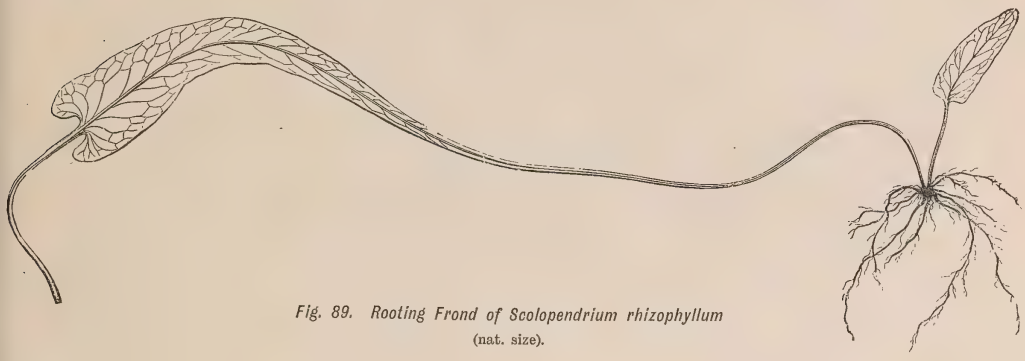


Fig. 89. Rooting Frond of Scolopendrium rhizophyllum (nat. size).

texture, deep green in colour, with the midrib a little paler than the rest and prominent on the under-surface. The short, irregular, linear-oblong spore masses are disposed on the marginal veinlets.—*Hooker*, *Species Filicum*, iv., p. 4. *Nicholson*, *Dictionary of Gardening*, iii., p. 393. *Lowe*, *Ferns British and Exotic*, v., t. 14A. *Eaton*, *Ferns of North America*, i., t. 8.

S. (Camptosorus) sibiricum—Camp-tos-o′-rus ; sib-i′-ric-um (Siberian), *Hooker.*

This hardy species, native of Western Siberia, Kamtschatka, Tsus-Sima, and Japan, is a singular plant, producing two totally distinct kinds of fronds. Both are of a somewhat leathery texture and borne on stalks that are 2in. to 3in. long, naked, green upwards, and dark brown below. The barren ones, only 1in. long and barely ½in. broad, are egg-shaped and sharp-pointed, while the fertile ones, 6in. or more in length and ¼in. broad, have their extremity lengthened and rooting like that of *S. rhizophyllum*, but they are gradually

narrowed instead of being auricled at their base. The spore masses are either linear or oblong. This species succeeds well planted out in a sheltered and shady place, especially when kept in a vertical position amongst stones.—*Hooker*, *Species Filicum*, iv., p. 4; *Second Century of Ferns*, t. 35. *Correvon*, *Les Fougères rustiques*, p. 124.

S. vulgare—vul-ga′-rĕ (common), *Smith.*

On account of the shape of its fronds, this ornamental, hardy species, also known as *S. officinale* and *S. officinarum*, is popularly called the "Common Hartstongue" Fern. It is a native of various parts of Europe, Madeira, the Azores, and the Caucasus, as well as Japan and North and South America; but there are no records of its having been found in any part of India. Eaton, in "Ferns of North America" (vol. i., p. 248), states that it is found growing in the crevices of broken lime rock, in deep ravines in Onondaga and Madison Counties, New York, Owen Sound, Ontario, and Canada, and that, though among the rarest of American Ferns, it is a common plant in Europe. Correvon states ("Fougères rustiques," p. 120) that it is abundant on the Jura Mountains and all over the Alps in limestone parts, that it is also spread over the German States, Austria-Hungary, and all the South-West of Europe, and is very plentiful in England and Ireland, but scarce in Scotland. It is really one of the commonest of our British Ferns, and is to be found in almost every county of the British Islands.

Mr. W. Johnson, in his "British Ferns," published in 1861, states (p. 264) that the "Hartstongue Fern" was known to Turner, Gerarde, Ray, and other ancient herbalists as *Phyllitis*, and that a variety with the extremity of the fronds divided into irregular ends is described and depicted by Gerarde under the name of *Phyllitis multifida*. He says that Gerarde found it in the garden of Master Cranwich, a chirurgeon dwelling at Much-Dunmow, in Essex, "who," he adds, "gave me a plant for my garden." Although it is also stated that Mr. C. Johnson found specimens 4ft. long and nearly 4in. broad in the open vault near the great hall of Conway Castle, the normal fronds of this species are 6in. to 18in. long and 1½in. to 3in. broad; they are borne on stalks 4in. to 8in. long and hairy at the base, are strap-shaped, entire, usually bluntish at their summit, and heart-shaped at the base. Their texture is somewhat leathery and their colour usually bright green; their fructification

is abundant, generally more so towards the extremity. The linear (narrow) spore masses are mostly disposed in parallel pairs, oblique with regard to the midrib, and of a brownish-black colour which has a most pleasing effect, the contrast with the bright green tint of the frond being very striking.—*Hooker*, *Species Filicum*, iv., p. 1; *British Ferns*, t. 37; *Icones Plantarum*, t. 488. *Nicholson*, *Dictionary of Gardening*, iii., p. 393. *Eaton*, *Ferns of North America*, i., t. 32. *Lowe*, *Our Native Ferns*, ii., t. 49. *Correvon*, *Les Fougères rustiques*, p. 119.

The Hartstongue is readily propagated by division and is also reproduced from spores, which, however, are exceedingly variable. The predisposition to variation in this species is such that it is not unusual to find in a batch of seedlings raised from spores gathered from the typical plant that the deviations from the type are more numerous than the normal forms. As an illustration of this we may here reproduce a statement made by Correvon, in his "Fougères rustiques" (p. 121): "In 1885 spores of *S. vulgare*, gathered in the 'Jardin Alpin,' were by us sown in a pan—a sowing which caused us the greatest surprise by its results. Very few of the young plants produced had retained the characters peculiar to the normal or typical form; the fronds of many of them were lacerated along the edges, and of a much darker colour than those of the type; others, and these were the most numerous, had their fronds divided and the stalks suddenly digitate. In some cases that division took such a shape as to form a regular crest composed of pinnules and segments."

The really distinct varieties of *S. vulgare*, either naturally produced or resulting from cultivation, are very numerous, upwards of a hundred having received first-class certificates at the Royal Horticultural Society's Meetings; and their various characters are so different from the normal form that a mere description of the usual fronds gives a very inadequate idea of the extensive variations found among the representatives of this species. The varieties described below are those which are the most distinct and at the same time the most ornamental, and most of these are to the present day found in private collections.

S. v. acrocladon—ac-roc'-lad-on (branched at the summit), *Lowe*.

A variable form, originally found near Ambleside, with fronds normal except at their summit, where they are divided into numerous finger-like lobes.

Including the stalks, the fronds seldom exceed 1ft. in length.—*Lowe*, *Our Native Ferns*, ii., fig. 600. *Nicholson*, *Dictionary of Gardening*, iii., p. 393.

S. v. bimarginato-cordatum — bim-ar-gin-a′-to–cor-da′-tum (double-margined, heart-shaped), *Moore*.

In this singular and pretty form, the much-contracted, narrow fronds, scarcely more than 1in. broad, have their upper surface very warty; they also show double marginal ribs at their back, and bear at the base, next the stalk, two large, roundish or heart-shaped lobes.—*Druery*, *Choice British Ferns*, p. 136.

S. v. bimarginato-multifidum—bim-ar-gin-a′-to–mul-tif′-id-um (double-margined, much cleft), *Moore*.

The fronds of this variety, ½in. or less in breadth, are double-margined on their under-side; their upper surface is broken up into a quantity of very thickly-set, more or less variable-sized projections and depressions slanting outwards, often slightly pouched here and there, and projecting irregularly beyond the margin. They have a large, much-divided summit, made up of narrow branches bearing spore masses along their margins.—*Lowe*, *Our Native Ferns*, ii., fig. 674.

S. v. bimarginatum—bim-ar-gin-a′-tum (double-margined), *Lowe*.

This very curious, distinct, and constant form was originally found at Rotherham, in Yorkshire, and subsequently at Brecon, at Ulverston, and at Oldstead, and has been raised from spores by Mr. C. Elworthy. Its fronds, 6in. to 9in. long and ¼in. to ½in. wide, are truncate at the base and usually simple, though sometimes multifid at their summit. Their margin is cut into narrow, shallow lobes, which are toothed or twice cleft. The lobes are margined on both surfaces and their upper surface is irregularly broken into cavities and excrescences.—*Lowe*, *Our Native Ferns*, ii., fig. 649.

S. v. capitatum—cap-it-a′-tum (headed), *Lowe*.

A very distinct form, originally found near Littleham, in Devonshire, with a crimped margin becoming flat near the rachis. The base of the fronds is lobed on one side only, and their summit, being much branched, forms a compact, multifid head.—*Lowe*, *Our Native Ferns*, ii., p. 338.

S. v. c. Forsteri—Fors′-ter-i (Forster's), *Druery*.

This sub-variety is quite distinct, its branched stalks, with no leafy portion to speak of, terminating in dense, rounded crests of a pale green colour.—*Druery, Choice British Ferns*, p. 137.

S. v. Claphamii—Clap-ham′-ĭ-i (Clapham's), *Moore*.

A singular and distinct form, found at Grassington, Wharfedale, Yorkshire, with fronds 1¼ft. long, 2in. broad, furnished at their base with a pair of narrow, sharp-pointed lobes. They are crisped and irregularly cleft along their margins, their summit is branched, and the branches are repeatedly forked.—*Lowe, Our Native Ferns*, ii., fig. 727. *Nicholson, Dictionary of Gardening*, iii., p. 393.

S. v. Cliftii—Clift′-ĭ-i (Clift's), *Lowe*.

This variety, originally found in North Wales, is very distinct and pretty. Its fronds, about 1ft. long, have their lower half naked, the leafy portion being narrow, of a leathery texture, with a smooth, even margin ; it terminates in a large, compact, much-branched head, very leafy, and uncut on the margins. —*Lowe, Our Native Ferns*, ii., fig. 640.

S. v. conglomeratum—con-glom-er-a′-tum (massed together), *Lowe*.

Though somewhat resembling the better-known *S. v. glomeratum*, this variety, found at Truro, differs essentially from that form in being of a less leafy character, that is, more deeply cut at the summit and more or less depauperated (impoverished) between the crest and the plain portion of the fronds, which is almost reduced to the stalk itself. This variety is perhaps better known as the Truro form of *glomeratum*.—*Lowe, Our Native Ferns*, ii., fig. 691. *Druery, Choice British Ferns*, p. 137.

S. v. congregatum—con-greg-a′-tum (collected), *Lowe*.

This is a very distinct, large-growing, multifid variety. The stalk is twin-branched near the base, then naked for about 3in., when it branches again ; the summit of the leafy portion of each frond expands into a large, multifid, crisped, narrowly-cleft, compact, bushy head.—*Lowe, Our Native Ferns*, ii., fig. 772.

S. v. Coolingii—Coo-ling′-ĭ-i (Cooling's), *Lowe.*

This is one of the few varieties known to be proliferous. It is a very handsome plant, of dwarf habit, with short fronds branching near the base; their stalks are branched a second time, while the leafy portions are repeatedly branched, their divisions being wavy and finger-like, forming a ball-like object seldom more than 6in. in height. Numerous little bulbils are found on the edge of their leafy portion.—*Lowe, Our Native Ferns*, ii., fig. 744.

S. v. coronare—cor-o-na′-rĕ (crowned), *Lowe.*

A beautiful variety, raised from spores by Mr. E. J. Lowe. It has more or less oblong-egg-shaped fronds about 9in. long, usually lobed on one side only at the base, slightly wavy along the margins, and notched below the contracted part, where the stalk divides into a numerously-branched, flat head, 4in. across.—*Lowe, Our Native Ferns*, ii., fig. 718.

S. v. Cousensii—Cou-sens′-ĭ-i (J. Schott Cousens'), *Moore.*

A wild find of very remarkable character, the fronds being repeatedly branched like those of *S. v. Wardii*, but forming much larger, rounded heads of foliage, consisting of innumerable small, fan-shaped lobes, of which the late Thomas Moore counted 166 in one frond, each being again subdivided into smaller lobes. The plant becomes a spherical mass and occasionally bears marginal bulbils.—*Druery, Choice British Ferns*, p. 138.

S. v. crenato-lobatum—cre-na′-to–lo-ba′-tum (jagged-lobed), *Moore.*

A very interesting variety, normal in size and general outline, though its fronds, which along their margins are distinctly jagged and lobed, are sometimes widest at their middle. They attain from 1ft. to 1¼ft. in length and their abundant and prominent spore masses show on the upper surface, where they appear very large.—*Lowe, New and Rare Ferns*, p. 56; *Our Native Ferns*, ii., fig. 594.

S. crenato-multifidum—cre-na′-to–mul-tif′-id-um (jagged and multifid), *Moore.*

This handsome form is said by Lowe to have been gathered by several persons in various limestone districts. The fronds are conspicuously jagged along the margins and have a marginal line on their under-surface; they are

repeatedly forked at their summit, measure from 1ft. to 2ft. in length and over 1in. in breadth, and are very scaly, especially near the midrib.—*Lowe*, *Our Native Ferns*, ii., fig. 605.

S. v. crispum—cris′-pum (frilled), *Gray*.

Though this is one of the oldest known varieties, it is also one of the most beautiful in cultivation ; it is an easily-grown plant, of excellent habit, with elegant, frilled fronds of normal size. It is singular that this permanently barren form should have been found in a wild state in so many places, where it must have sprung up spontaneously, as there are no records of spores having ever been found on either cultivated or wild plants of it ; yet it has been gathered in Guernsey, at Barnstaple, at Byland Abbey, and at Furness Abbey. A well-grown plant of *S. v. crispum* makes a splendid object for the outdoor or indoor Fernery ; its luxuriant spreading fronds, 2in. broad, deeply and regularly wavy, and furnished at their base with unusually large lobes, when viewed edgewise, exactly resemble a frill.—*Lowe*, *Our Native Ferns*, ii., p. 359. *Druery*, *Choice British Ferns*, p. 137.

Mr. Druery judiciously remarks : " The *crispum* section represents the plumose form of this species, the leafy portion being very much developed, so that a more or less deep frill is formed on each side of the main stalk, and it is worthy of notice also that the most highly developed forms are perfectly barren. The wild finds of this description have been many, and though there are about a dozen forms sufficiently distinct to be easily discriminated by the eye, it would be impossible to convey the difference clearly in writing." The most distinct are : *amplum*, *cristatum*, *grandidens*, and *multifidum*, of Lowe ; *majus*, of Jackson ; *bulbiferum*, *fertile*, *fimbriatum*, and *Stansfieldii*, of Stansfield.

S. v. crista-galli—cris′-tă-gal′-li (cock's comb), *Wollaston*.

This beautiful form, though somewhat allied to the better-known *S. v. multifidum*, is yet very distinct. Its handsome fronds, 12in. to 14in. long, 1½in. to 2½in. broad, heart-shaped at the base, and more or less wavy in the lower portion, have their margins notched and terminate in a compactly crispy tuft of inward-folding, slightly-twisting leaflets. It was originally found at Glanville's Wootton, in Dorsetshire, but was subsequently gathered at Nettlecombe, at Malham, and on Whitbarrow.—*Lowe*, *Our Native Ferns*, ii., p. 314.

S. v. cristatum—cris-ta′-tum (crested), *Moore.*

As Mr. Charles T. Druery rightly remarks, "there are a great many slightly different forms to which this name properly applies, the crests varying only in character and size"; all of these are very handsome, and differ from most if not from all other crested forms inasmuch as the fronds, with the exception of the crest, are normal in size and outline. In the present case they are much divided and form tasselled heads (Fig. 90); they seldom exceed 8in. in length.—*Lowe, Our Native Ferns*, ii., t. 50A. *Druery, Choice British Ferns*, p. 138.



Fig. 90. Frond of Scolopendrium vulgare cristatum (¼ nat. size).

There are several sub-varieties in cultivation, differing principally in dimensions, such as *S. v. c. majus* and *S. v. c. minus*, larger and smaller forms respectively, but the most distinct, and undoubtedly also the most interesting, is

S. v. c. viviparum—vi-vip′-ar-um (viviparous), *O'Kelly.*

This is a very singular wild find, native of Ireland, with short, somewhat square, pointed lobes at the base of its fronds, which are slightly contracted just below a neat, semicircular crest. The great peculiarity of this Fern consists in the formation, on the upper surface, under close treatment, of numerous warty ridges, which develop into clusters of tiny plants (Fig. 91). It is not only curious and distinct, but also very pretty.—*Druery, Choice British Ferns*, p. 138, fig. 29.

S. v. cristulatum—cris-tul-a′-tum (small-crested), *Cropper.*

This is one of the prettiest of all crested forms; it is of medium size and habit. The fronds branch low down into several ramifications, each of which is tipped with a compact, ball-shaped, moss-like crest of a dark green colour.—*Druery, Choice British Ferns*, p. 137.

S. v. digitatum—dig-it-a′-tum (having fingers), *Wollaston.*

This, undoubtedly one of the most beautiful of the many crested forms of the Hartstongue, was originally raised from spores by Mr. Wollaston,

although it was eventually found wild at South Weald, Brentwood, Essex. Its short, often twin-stalked, nearly erect fronds are much branched in their central part, where they form a dense tuft of crowded, much overlapping segments, which terminate in a repeatedly short, branched head, of which the ultimate branchlets or lobes are deeply cut and crispy; each fan-like frond is about 9in. wide.—*Lowe*, *Our Native Ferns*, ii., p. 267.

S. v. Elworthii — El-wor′-thĭ-i (Elworth's), *Moore*.

A singular, dwarf-growing variety. Its fronds, not including the stalks, are scarcely more than 2in. long and 3in. broad; they consist of three branches, one of which is usually three times divided, the branches being fan-shaped and deeply cut, with wavy, overlapping lobes.—*Lowe*, *Our Native Ferns*, ii., fig. 632.

S. v. endivæfolium — en-di-væ-fol′-ĭ-um (Endive-leaved). A commercial name for *S. v. laceratum*.

S. v. fimbriatum—fim-brĭ-a′-tum (fringed), *Allchin*.

This very distinct and extremely pretty variety, also known in gardens as *S. v. marginatum tenue*, was originally found in Guernsey. It is a distinct form of the *marginatum* section, with two kinds of fronds: the broader ones are 6in. long, ¾in. broad, contracted at the base, and irregularly fringed along their margins; the narrower are 9in. to 12in. long, ¼in. wide, and nearly erect. So narrow is the leafy portion, which is of very thick texture, that on either side it is only of the same width as the stalk itself. The margins are finely fringed.—*Lowe*, *Our Native Ferns*, ii., fig. 642.



Fig. 91. Scolopendrium vulgare cristatum viviparum (½ nat. size).

S. v. fissum latum—fis′-sum la′-tum (split and broad), *Moore.*

A large-growing form, found near Nettlecombe, producing fronds 2ft. in length and fully 2in. in breadth, deeply and irregularly cut along the margins, slightly wavy, narrowed to the base, and sharp-pointed at their summit. The large and irregular spore masses are produced in great abundance.—*Lowe, Our Native Ferns*, ii., fig. 653.

S. v. flabellatum—fla-bel-la′-tum (fan-shaped), *Moore.*

This is a constant and very handsome form, with repeatedly-branched, fan-shaped fronds 6in. to 8in. long and as much across in their multifid portion. In their lower part these fronds are normal, but in their upper half the stalk becomes repeatedly branched, the whole forming a scarcely crested, nearly flat frond.—*Lowe, Our Native Ferns*, ii., fig. 661.

S. v. Glavei—Gla′-vĕ-i (Glave's), *Lowe.*

In this singular form, raised from spores, the fronds, 6in. long, of which the lower 4in. consists of the naked stalks, are repeatedly branched into a number of almost leafless, narrow divisions, which are torn and toothed on the margins.—*Lowe, Our Native Ferns*, ii., fig. 672.

S. v. glomerato-variabile — glom-er-a′-to–var-ĭ-a′-bil-ĕ (heaped-up and variable), *Monkman.*

One of the most interesting and beautiful forms raised from spores. Its fronds, about 16in. long, have their basal 6in. naked; they vary in width across the head from 6in. to 10in., and there are seldom two fronds exactly alike: most of them, however, are repeatedly branched and their leafy portion is handsomely crested.—*Lowe, Our Native Ferns*, ii., fig. 724.

S. v. glomeratum—glom-er-a′-tum (heaped-up), *Moore.*

A very fine and beautiful form, originally found in Jersey, with fronds nearly upright, twice branched, each branch again three or four times branched, the ultimate ones more or less deeply lobed, and the lobes broadly blunt-toothed. Sometimes the disposition differs in the stalk branching at the base of the frond, which is thus in two close parts, each being again three or four times short-branched, and each series of ramifications standing in a different position, thus collectively forming a dense, globular, crispy mass 3in. to 4in. across.—*Lowe, Our Native Ferns*, ii., fig. 690.

S. v. Gloverii—Glo-ver′-ĭ-i (Glover's), *Stansfield.*

A dwarf, much-branched variety, somewhat resembling a diminutive *S. v. glomeratum.* The stalks of the fronds are several times repeatedly branched, and their leafy portion, also repeatedly branched or divided, forms a mass of cresting with smooth and rounded edges.—*Lowe, Our Native Ferns*, ii., fig. 752.

S. v. grandiceps—gran′-dic-eps (large-headed), *Lowe.*

This variety, of obscure origin and of somewhat large dimensions, is one of the finest crested forms in cultivation. The branching of the stalk takes place in the centre of the frond, where it divides into a large and much-branched, very leafy, double cockscomb-like head (Fig. 92). It is peculiar in frequently bearing a sharp, cockspur-like projection near the base of the stalks.—*Lowe, Our Native Ferns*, ii., fig. 723. *Druery, Choice British Ferns*, p. 140.



Fig. 92. Frond of Scolopendrium vulgare grandiceps (much reduced).

S. v. Hendersonii—Hen-der-son′-ĭ-i (Henderson's), *Willison.*

This is a very pretty form, only 5in. or 6in. in height, originally found near Whitby. The stalks branch at the base, and each one again forks about 1in. above the base; these branches almost immediately divide into dwarf fronds, normal in their lower portion, but divided again at their summit into beautifully-crested heads, resembling five or six multifid fronds.—*Lowe, Our Native Ferns*, ii., fig. 689.

S. v. Hookerii—Hook′-er-ĭ-i (Hooker's), *Lowe.*

A beautiful form, raised from spores by Mr. E. J. Lowe. Its massive fronds are nearly or quite triangular, being as broad at the base as they are long, namely 6in. They are very leafy, lacerated here and there, much divided along their margins, with lobes overlapping, and terminate in a round, tasselled summit.—*Lowe, Our Native Ferns*, ii., fig. 693.

S. v. Jamesii—James′-ĭ-i (James's), *Lowe.*

This singular Fern, with fronds of a very leathery texture, was raised from spores by Mr. James, of Vauvert. The slightly-crisped fronds are of

a curious shape, being halbert-shaped at the base and very variable at the summit, where they are usually much divided after the manner of stag's horns. The spore masses, which are formed within the narrow margins of the fronds, appear on their upper surface like a row of beads.—*Lowe, Our Native Ferns*, ii., fig. 680.

S. v. jugosum—jug-o′-sum (full of ridges), *Moore.*

Originally found in Guernsey, and subsequently at Barnstaple and at Ottery St. Mary, this variety is easily distinguished through the thickening of the veins which bear the spore masses. The fronds also show a series of herbaceous ridges or sorus-like excrescences on their upper surface, on the opposite side to the spore masses proper. Their length varies from 1ft. to 1¼ft.—*Lowe, Our Native Ferns*, ii., t. 52B ; *New and Rare Ferns*, t. 24B.



Fig. 93. Scolopendrium vulgare Kelwayii (⅛ nat. size).

S. v. Kelwayii—Kel-way′-ĭ-i (Kelway's), *Moore.*

Undoubtedly this is one of the prettiest forms in cultivation ; its good habit (Fig. 93) and its medium dimensions render it a very useful and desirable plant for decoration. The fronds, which seldom exceed 10in. in total height, are borne on slender yet stiff stalks branching near the base, and branching again 3in. to 4in. higher up. The whole of the leafy portion is repeatedly forked, being formed of densely-overlapping lobes and of a most pleasing green colour.—*Druery, Choice British Ferns*, p. 137, fig. 28.

S. v. keratoides—ker-at-ŏ-i′-des (horn-like), *Lowe.*

This variety, one of the most interesting in cultivation, was raised from spores by Mr. A. Clapham. The total length of the fronds is about 9in., and their leafy portion is very narrow at the base. Their stalks branch about 3in. above the base, and branch again two or three times, all the parts of the fronds being narrow and jagged ; they terminate in a crest made up of

narrow, very irregular divisions of a stag's-horn-like appearance, which suggested the name.—*Lowe*, *Our Native Ferns*, ii., fig. 775. *Druery*, *Choice British Ferns*, p. 140.

S. v. laceratum—lac-er-a′-tum (torn), *Moore.*

A strikingly handsome variety, better known perhaps in gardens under the name of *S. v. endivæfolium;* it was originally found at Taunton, and subsequently in Yorkshire. Though a very old plant, it is one of the most beautiful and distinct forms met with in collections to this day. Its fronds are variable, frequently short and broad, though sometimes 1ft. long; they are comparatively broad at the base and more or less crested at their summit. The margins are so deeply cleft into projecting lobes, that, as Mr. Chas. T. Druery remarks, "in this form the Hartstongue seems to aim at bearing pinnæ (leaflets) like other Ferns, the margin running out into long, sometimes crested points." The basal lobes, which usually are the longest (frequently 4in. long and 1in. wide), bear pronounced flat crests; in the other parts of the fronds the lobes considerably overlap, and frequently the extremity of the frond consists of a frilled tassel of great beauty. This variety possesses the property of reproducing itself fairly true from spores.—*Lowe*, *Our Native Ferns*, ii., fig. 610. *Druery*, *Choice British Ferns*, p. 140.

S. v. lacertum—lac′-er-tum (lizard-like), *Lowe.*

According to Lowe, this most singular variety was originally found at the Woodlands, near Whitby, by Mr. W. Willison, and called by him "The Lizard," from the fact that the extremity of the frond frequently resembles the tail of the lizard, and that the lateral lobes, few in number, bear some resemblance to the paddles of this reptile. The fronds otherwise are of normal dimensions.—*Lowe*, *Our Native Ferns*, ii., fig. 715.

S. v. lato-digitatum — la′-to-dig-it-a′-tum (having broad fingers), *Stansfield.*

A beautiful and constant variety, raised from spores by Messrs. Stansfield, of Todmorden. The fronds, about 8in. long and nearly 2in. broad, are quite normal below, the stalk branching about 4in. from the base into a wide, finger-shaped head nearly 6in. broad, solid and leafy, with a margin irregularly but profusely cleft (Fig. 94).—*Lowe*, *Our Native Ferns*, ii., fig. 769.

S. v. Malcomsoniæ—Mal-com-son′-ĭ-æ (Miss Malcomson's), *Stansfield.*

A fine form, originally found at Clonmel by the lady to whom it is dedicated. The normal part of its fronds is divided into two parts at the base, and about 2in. below the summit they branch again into a large, nearly circular head; they become narrower near the summit of each tip and then expand into a large, dense, hand-like head, with narrow lacerations.—*Lowe, Our Native Ferns*, ii., fig. 768.



Fig. 94. Frond of Scolopendrium vulgare lato-digitatum (½ nat. size).

S. v. marginatum—mar-gin-a′-tum (edged), *Moore.*

It may appear strange that such a distinct and singular form should have been found in so many localities; but, according to Lowe, it was first discovered at Nettlecombe, then near Selworthy, in Somerset; at Ilfracombe and Combe Martin, Devon; at Enys, Penryn, Cornwall; at Littlehampton, Sussex; at Stroud, Gloucestershire; at Grassington, Yorkshire; in the Isle of Wight, and in Guernsey. Its erect fronds, about 1ft. long and 1in. in breadth, are of a very thick texture and dark green in colour; their margins are a little wavy and lobed, the lobes being blunt-toothed. On the under-surface, nearly parallel with the midrib, but somewhat nearer to the margin, are two skin-like lines, which, in fertile fronds, break up into ragged, projecting points ¼in. long, rather closely set and spore-bearing; the fertile parts are on and outside of these lines only.—*Lowe, Our Native Ferns*, ii., fig. 609. *Nicholson, Dictionary of Gardening*, iii., p. 394. *Druery, Choice British Ferns*, p. 140.

Of the numerous sub-varieties of *S. v. marginatum* in cultivation, the most distinct are: *marginato-irregulare*, *marginato-multiceps*, and *marginato-multifidum*, of Moore; *marginato-laceratum*, of Clapham; *marginato-triforme*, of Padley; and *S. v. m. tenue* is a garden name for *S. v. fimbriatum.*

S. v. multifidum—mul-tif′-id-um (much cut), *Gray.*

This beautiful and distinct form was originally found at Littlehampton, and subsequently at Nettlecombe; at Frenchay, near Bristol; in Cumberland; at Ruthin, Colin Glen, Kilmoganny, Kilkenny, and Black Head, Clare, &c. Its fronds, of normal dimensions, and 2in. to 3in. broad, are divided near the top, each branch being again once or twice forked and their ultimate segments deeply cleft into angular lobes, thus forming a broadish, dense, flattish tuft—*Lowe, Our Native Ferns*, ii., fig. 646. *Nicholson, Dictionary of Gardening*, iii., p. 394.

S. v. omnilacerum—om-nil-ac′-er-um (wholly torn), *Lowe.*

This elegant variety, which has the appearance of being pinnate, was raised from spores by Mr. Glave, of Scarborough. Its fronds, 18in. to 20in. long and comparatively narrow, are cleft almost to the midrib, the lacerations being furnished with spore masses all along their margins and toothed at their extremity.—*Lowe, Our Native Ferns*, ii., fig. 741.

S. v. patulum—pat′-ul-um (spreading), *Lowe.*

A very large form of *S. v. ramosum*, found at Littleham, Devonshire. The stalk branches in the middle of the frond, and each of these branches is repeatedly divided.—*Lowe, Our Native Ferns*, ii., fig. 641.

S. v. peraferens—pe-raf′-er-ens (pocket-bearing), *Wollaston.*

This variety, originally found in Ireland, is rendered very peculiar by the presence of a pouch which is produced at the summit of its otherwise normal fronds. These are 6in. to 12in. long, 2in. broad, heart-shaped at the base, and somewhat wavy along the margins. The midrib is occasionally prolonged in the shape of a horn projecting through the membrane which forms the pouch.—*Lowe, Our Native Ferns*, ii., fig. 599. *Druery, Choice British Ferns*, p. 141.

S. v. pinnatifidum — pin-na-tif′-id-um (cut half-way to the midrib), *Moore.*

In this singular and pretty variety, raised from spores by Mr. Elworthy, of Nettlecombe, the fronds, 10in. long and ¾in. broad, are of a peculiar shape,

being narrow at the base, gradually widening upwards, and broadest at their summit, where they are rounded; they are pinnatifid on both sides, with deep, open sinuses (depressions).—*Lowe*, *Our Native Ferns*, ii., fig. 762.

S. v. polymorphon—pol-ym-orph′-on (of many forms), *Lowe*.

This remarkably handsome form was originally found in Devonshire. Its robust fronds, 16in. to 18in. long, are lobed on one side of the base only and increase in width to their centre, where they frequently measure close upon 3in. About 2½in. below their summit the midrib divides and forms a compact, multifid, leafy head, fully 6in. wide, and composed of leafy, angular-pointed segments. It is singular that in this variety the fructification is restricted to the multifid portion.—*Lowe*, *Our Native Ferns*, ii., fig. 732.

S. v. projectum—pro-jec′-tum (projecting), *Moore*.

A distinct variety, found at Ilfracombe, Nettlecombe, Kendal, Newick, Tenby, and Scarborough. It is of large dimensions, its fronds being sometimes nearly 2ft. long and 2¼in. broad, except across the projecting lobes, where they measure fully 4in.; they are heart-shaped at the base, and gradually taper to a point at the summit. Their peculiarity consists in the broadish, sharp-pointed lobes, which here and there project 1in. beyond the general outline of the frond; these projections are confined to the upper half of the fronds.—*Lowe*, *Our Native Ferns*, ii., fig. 731.

S. v. proliferum—pro-lif′-er-um (proliferous), *Wollaston*.

This extremely curious variety, raised from spores by Mr. Wollaston, belongs to the *marginatum* group, the upper surface of its short, narrow fronds being irregularly warty and there producing tiny bulbil-plants; their under-surface has the ragged-pointed lines of *S. v. marginatum*, with the midrib often projecting like a little horn. Occasionally the fronds are without any leafy portion, being composed entirely of stalk and midrib, and these taper and are pointed like an awl.—*Lowe*, *Our Native Ferns*, ii., fig. 630.

S. v. ramo-cristatum—ra′-mo-cris-ta′-tum (branched, crested), *Moly*.

This variety must not be confounded with *S. v. ramoso-cristatum* of Moore, as it is thoroughly distinct. Druery describes it as a unique wild

find of extraordinary beauty, and Fig. 95 shows it to be a plant quite distinct from any other known form. The frond is divided into distinct leaflets which end in a very elegant crest.—*Druery*, *Choice British Ferns*, p. 142.

S. v. ramo-marginatum — ra′-mo–mar-gin-a′-tum (branched, margined), *Clapham.*

This exceedingly beautiful variety—one of the most distinct of the many crested forms of the Hartstongue—was raised from spores by Mr. A. Clapham, of Scarborough. It is usually twin-stalked, each stalk bearing twice or thrice-branched, nearly erect fronds, the lower portion of which is much narrowed, seldom exceeding ½in. in breadth. Each branch ends in a nearly circular, flattish crest 2in. to 3in. wide, consisting of many branchlets overlapping near its circumference, but gaping and marginate below. In fully-developed specimens, the length of the fronds varies from 9in. to 12in., and their breadth across the terminal tassel is about 6in. —*Lowe*, *Our Native Ferns*, ii., fig. 778 ; *New and Rare Ferns*, t. 23. *Druery*, *Choice British Ferns*, p. 142.



Fig. 95. Frond of Scolopendrium vulgare ramo-cristatum (½ nat. size).

S. v. r.-m. proliferum—pro-lif′-er-um (proliferous), *Sim.*

A small-growing form of *S. v. ramo-marginatum*, with broader and more leafy fronds, scarcely marginate, but producing freely on the surface of its more or less irregular fronds tiny bulbil-plants, from which it is readily propagated.—*Lowe*, *Our Native Ferns*, p. 306.

S. v. ramoso-cristatum—ra-mo′-so–cris-ta′-tum (branched, crested), *Moore.*

A very handsome form, of upright habit, raised from spores by Mr. A. Clapham, and distinct through its fronds being destitute of all leafy character in their lower half and branched in their upper half, where they are furnished with repeatedly multifid branchlets, bearing segments crested in a crisped manner.—*Lowe*, *Our Native Ferns*, ii., fig. 737.

S. v. ramosum—ra-mo′-sum (branched), *Willdenow.*

Though an old variety, having been known, according to Lowe, since the time of Plukenet, this is exceedingly handsome. Its short, dense fronds, of nearly erect habit, consist of a multiplication of furcations ; the stalk, which starts singly from the crown, becomes branched like the limbs of a tree, the midrib being often again branched below and each branch bearing a dense, multifid, crisped tuft.—*Lowe, Our Native Ferns*, ii., fig. 686.

S. v. r. majus—ma′-jus (greater), *Clapham.*

Though raised from spores by Mr. Clapham, this handsome form was also found in a wild state at Haburn Wike, near Scarborough. Its fronds, fully 1½ft. long, are provided with very thick stalks branching into several broad, leafy portions, heart-shaped at their base, attenuated at their extremity, and somewhat wavy along their edges.—*Lowe, Our Native Ferns*, ii., t. 55.

S. v. reniforme—re-nif-or′-mĕ (kidney-shaped), *Williams.*

This singular variety, more curious than beautiful, produces fronds which sometimes are truly kidney-shaped and at other times are variously lobed. It was originally found in Devonshire, then at Oldstead, and again in the Channel Islands.—*Lowe, Our Native Ferns*, ii., t. 50 ; *New and Rare Ferns*, t. 47.

S. v. sagittato-crispum—sag-it-ta′-to-cris′-pum (arrow-head-shaped and crisped), *Moore.*

A very distinct variety, with much crisped or waved fronds 12in. to 14in. long, 3in. broad, and elongated at their base into a pair of sharp-pointed lobes. This plant, which produces spore masses in abundance, was originally found at Petersfield, Hampshire, and eventually at Ottery St. Mary, and at Barnstaple, Devonshire.—*Lowe, Our Native Ferns*, ii., p. 324.

S. v. sagittato-cristatum—sag-it-ta′-to-cris-ta′-tum (arrow-head-shaped and crested), *Clapham.*

This handsome, strong-growing form, originally found near Scarborough and later on in Devonshire and in several other localities, is somewhat variable in form. Its fronds, slightly undulated or wavy, are of medium size and arrow-shaped at the base ; the enlarged lobes, though generally pointing



Pteris cretica Ouvrardi
(much reduced)

downwards, are occasionally directed upwards, and the summit of the frond is usually crested and somewhat multifid (Fig. 96).—*Lowe, Our Native Ferns*, ii., p. 239 ; *New and Rare Ferns*, t. 51B. *Druery, Choice British Ferns*, p. 142.



Fig. 96. Frond of Scolopendrium vulgare sagittato-cristatum (much reduced).

S. v. sagittato-projectum — sag-it-ta′-to – pro-jec′-tum (arrow-head-projecting), *Moore.*

A magnificent variety, found simultaneously in County Clare and in North Wales. Its somewhat wavy fronds are arrow-shaped at the base, and their summit is sometimes abruptly pointed, sometimes more or less distinctly crested. The edges of the fronds, which are of the same width at their base and summit (Fig. 97), are deeply cut into irregular, sharp-pointed lobes, some ½in. long. — *Lowe, Our Native Ferns*, ii., fig. 745. *Druery, Choice British Ferns*, p. 142.



Fig. 97. Frond of Scolopendrium vulgare sagittato-projectum (⅓ nat. size).

S. v. sagittatum—sag-it-ta′-tum (arrow-head), *Allchin.*

A singular form, originally found at Tiverton, with fronds 1ft. long, broadest in the centre, and somewhat resembling a Roman sword in general outline. These fronds are provided with a pair of pointed lobes at their base, and their margin is rendered irregular through the presence of conspicuous, pointed lobes, which project beyond the general outline.—*Lowe, Our Native Ferns*, ii., fig. 722.

S. v. scalpturatum—scalp-tur-a′-tum (carved), *Moore.*

This form, as handsome as it is curious, was originally found in Guernsey. Its stiffish fronds, 1ft. long and 1in. to 1½in. broad, are of a particularly thick texture and of a peculiar deep green colour ; they are heart-shaped or rounded-lobed at the base near the stalk. The upper surface is flat to the

thickened margin, and there is apparently carved or broken up into small, almost stalked, flattish, thickly-set lobes, variable in outline, and forming confused, conspicuous lines. The spore masses are frequently disposed on the upper surface of the fronds.—*Lowe*, *Our Native Ferns*, ii., fig. 619.

S. v. spirale—spi-ra′-lĕ (spiral), *Moore.*

This singular, pretty, and distinct form, producing thick, leathery fronds twisted like a corkscrew and terminating in a sharp point, was found simultaneously in Guernsey and at Nailsworth, Gloucestershire. It usually measures from 3in. to 5in. in height, and is perfectly constant.—*Lowe*, *Our Native Ferns*, ii., fig. 631. *Druery*, *Choice British Ferns*, p. 142.

S. v. striatum—strĭ-a′-tum (striped), *Moore.*

A more or less distinctly marked variety, with broad fronds of a somewhat wavy nature, obliquely streaked with yellowish-green on a deep green ground, giving the whole plant a striated appearance.—*Lowe*, *Our Native Ferns*, ii., p. 320.

S. v. sublineato-striatum — sub-lin-ĕ-a′-to–strĭ-a′-tum (somewhat lined and striated), *Lowe.*

A very interesting variety, originally found in Devonshire. The fronds, of normal dimensions, are deeply cleft at their edges and margined with a line along their under-surface. It differs from other marginate varieties in having raised lines across the upper surface of the fronds, and the veins, being of a particularly dark colour, give the plant a striped appearance.—*Lowe*, *Our Native Ferns*, ii., t. 53A ; *New and Rare Ferns*, t. 51A.

S. v. submarginatum—sub-mar-gin-a′-tum (somewhat margined), *Wollaston.*

A very handsome form, with gracefully-arching, deep green fronds 1½ft. to 2ft. long, having their margins cleft into irregular lobes, as if torn, and these marginate-toothed. On the under-surface, following the irregularity of and near to the marginal lobes, is a thin, irregular line, sometimes altogether absent from parts of the frond. This plant has been found in Ireland, in Guernsey, and in various parts of England.—*Lowe*, *Our Native Ferns*, ii., t. 52A ; *New and Rare Ferns*, t. 24A.

S. v. subpinnatum—sub-pin-na′-tum (somewhat pinnate), *Moore.*

A singular, dwarf variety, originally found at Ilfracombe, with fronds 6in. long, 2in. broad, and split to the midrib into several irregular, rounded lobes, wedge-shaped at the base.—*Lowe, Our Native Ferns*, ii., fig. 611.

S. v. supralineatum—sup-ra-lin-ĕ-a′-tum (lined above), *Moore.*

In this very distinct form, which was originally found at Settle, in Yorkshire, and eventually in various parts of England, the fronds, 6in. to 12in. long and 1in. to 2in. broad, have an excurrent membrane developed on their surface. Their base is usually heart-shaped, their extremity blunt or somewhat lobed, and the margins, which show on each side an interrupted, membrane-like line, irregularly lobed or toothed, are occasionally wavy.—*Lowe, Our Native Ferns*, ii., fig. 620.

S. v. suprasoriferum—sup-ra-so-rif′-er-um (bearing sori above), *Lowe.*

A most singular and interesting form, with fronds of normal dimensions, being 1ft. or more long and 1in. to 2in. broad, notched along the margins, and bearing spore masses on their upper as well as on their under surface. It has been found in many localities in Great Britain.—*Lowe, Our Native Ferns*, ii., t. 56A.

S. v. undulato-ramosum—un-dul-a′-to-ra-mo′-sum (waved and branched), *Lowe.*

A fine variety, of large dimensions, with wavy fronds much branched at their summit, each branching portion being again conspicuously wavy. It was originally found in Devonshire.—*Lowe, Our Native Ferns*, ii., fig. 623.

S. v. undulato-rigidum—un-dul-a′-to-rig′-id-um (rigidly wavy), *Druery.*

This stiff-growing form of *S. v. crispum* is thoroughly distinct on account of its being constantly fertile. Its greatest claim to cultivation, however, lies in the fact that its spores invariably yield a proportion of the beautiful *S. v. crispum fimbriatum.*—*Druery, Choice British Ferns*, p. 143.

S. v. undulatum—un-dul-a′-tum (wavy), *Moore.*

This is a pretty form, allied to *S. v. crispum*, with regularly wavy fronds of a less crispy nature, narrower, and distinct in being always fertile.—*Lowe, Our Native Ferns*, ii., fig. 654.

S. v. variegatum—var-ĭ-eg-a′-tum (variegated), *Moore.*

There are several varieties of this Fern, with foliage of a more or less distinctly-marked nature, each form bearing in commerce the name of its discoverer; thus we have *variegatum Claphami* (Lowe, "Our Native Ferns," ii., t. 44B), a form of normal dimensions, beautifully variegated with white, but not quite permanent. Then there is *variegatum Elworthii* (Lowe, "Our Native Ferns," ii., fig. 738), which is a handsome permanent variety of a narrow normal form, much and conspicuously variegated. Another form, of dwarfer habit than either of the above-named, is variegated with yellowish-white and not very permanent; this is called *variegatum Willisonii*, and was found wild in North Yorkshire.—*Lowe, Our Native Ferns*, ii., p. 332; *New and Rare Ferns*, p. 58.

S. v. Wardii—Ward′-ĭ-i (Ward's), *Clapham.*

This very distinct form, of dwarf habit, was raised from spores by Mr. Glave, of Scarborough. Its singular fronds are borne on long stalks and form a small, massive, multifid head with a round outline, composed of repeatedly scarcely-branched, more or less crowded, very crispy parts, of which the marginal ones are cut into very irregular lobes, and these are very irregularly narrow-toothed and faintly marginate. In the close, moist atmosphere of a glass structure the fronds of this pigmy variety, seldom 6in. high, become profusely studded all over with tiny bubil-plants.—*Lowe, Our Native Ferns*, ii., fig. 677.

SCYPHULARIA—Scyph-ul-a′-rĭ-a. *See* **Davallia.**

SELLIGUEA—Sel-li′-guĕ-a. *See* **Gymnogramme.**

SITOLOBIUM—Si-tol-ob′-ĭ-um. *See* **Dicksonia.**

SOROMANES—So-rom′-an-ēs. *See* **Acrostichum.**

CHAPTER XV.

SPHÆROPTERIS, *Wallich.*

(Sphær-op′-ter-is.)

THE name of this genus is derived from *sphairo*, a globe, and *Pteris*, a Fern, in allusion to the fructification being covered by a globose involucre. *Sphæropteris* is a division of the tribe *Dicksonieæ*, and in Hooker and Baker's "Synopsis Filicum" forms Genus 12. It is monotypic, that is to say it comprises but one species; this requires stove temperature, a shady situation, and an abundance of water at the roots all the year round. It is propagated by spores, which are freely produced when the plant has attained its full development. *Podeilema* of R. Brown and *Nematoptera* of Kunze are synonymous with this genus.

S. barbata—bar-ba′-ta (bearded), *Wallich.*

This plant is a native of Nepaul, Sikkim, and Khasya, and Beddome states that it is found on the Western Ghats of the Neilgherries. Its fronds, 2ft. to 3ft. long, are tripinnate (three times divided to the midrib), and their oblong leafits are deeply pinnatifid. The base of the robust stalks is densely clothed with long, brown, sharp-pointed scales of parchment-like texture, while the stalks of the leaflets are also furnished with smaller ones. The spore masses, of a globose form, are disposed on the back of a vein or veinlet and contained in a large receptacle; the involucre (covering), of the same shape, at first encloses the whole sorus (spore mass), but at length bursts

vertically into two spreading lobes or lips. *Peranema cyatheoides* is another name for this species. — *Hooker*, *Species Filicum*, i., p. 58. *Nicholson*, *Dictionary of Gardening*, iii., p. 470. *Beddome*, *Ferns of Southern India*, t. 73.

STEGNOGRAMMA—Steg-nog-ram′-ma. *See* **Polypodium.**

STENOCHLÆNA—Sten-och-læ′-na. *See* **Acrostichum.**

STENOLOMA—Sten-ol-o′-ma. *See* **Davallia.**

STRUTHIOPTERIS—Stru-thĭ-op′-ter-is. *See* **Onoclea.**

SYNAPHLEBIUM—Syn-aph-leb′-ĭ-um. *See* **Lindsaya.**

SYNGRAMME—Syn-gram′-me. *See* **Gymnogramme.**

TÆNIOPSIS—Tæn-ĭ-op′-sis. *See* **Vittaria.**

CHAPTER XVI.

TÆNITIS, *Swartz.*

(Tæn-i′-tis.)

Fillet or Ribbon Ferns.

IN Hooker and Baker's "Synopsis Filicum" *Tænitis* (which derives its name from *tainia*, a fillet or ribbon, in allusion to the linear leaflets) forms a part of the tribe *Grammitideæ*, as Genus 57. It comprises only six known interesting species, all of which require stove treatment. Their sori (spore masses) are linear, but the line of fructification, either central or sub-marginal, though usually uniform, is sometimes interrupted. Some of the species scarcely differ from *Tæniopsis* (included under *Vittaria*) in fruit, but in all of them the veins intercross each other.

Culture.

The plants comprised in this genus require a soil of a peaty nature (two parts peat to one of loam), a moist atmosphere, and abundant shading. They are generally propagated by the division of the crowns.

Species and Varieties.

T. angustifolia—an-gus-tif-ol′-ĭ-a (narrow-leaved), *R. Brown.*

This species, native of Cuba and North Brazil, has simple (undivided) fronds 1ft. to 1½ft. long, ¼in. to ½in. broad, very gradually narrowed to a

sharp point above, and below to the base or a short stalk. They are of a somewhat leathery texture and of a flaccid nature, with a distinct midrib. The spore masses are sunk in a groove a short distance from the edge.—*Hooker*, *Species Filicum*, v., p. 187. *Nicholson*, *Dictionary of Gardening*, iv., p. 4.

T. blechnoides—blēch-nŏ-i′-dēs (Blechnum-like), *Swartz.*

In this very distinct species, native of Malaysia and the Philippine Islands, the fronds, produced from a creeping rhizome, are borne on firm, naked, glossy stalks 8in. to 12in. long. They are simply pinnate (only once divided to the midrib), 1ft. to 2ft. long, 8in. to 12in. broad, and provided with leaflets 6in. to 9in. long, 1in. to 2in. broad, oblong-spear-shaped, sharp-pointed, with the edge thickened and wavy, and wedge-shaped at the base. The fertile leaflets, which are narrower, are also the more numerous. All are of a leathery texture and have their spore masses disposed in a continuous line about midway between the edge and the midrib.—*Hooker*, *Species Filicum*, v., p. 188. *Nicholson*, *Dictionary of Gardening*, iv., p. 4.

T. b. interrupta—in-ter-rup′-ta (interrupted), *Wallich.*

A variety readily distinguished from the foregoing species by its smaller leaflets and especially by the disposition of its spore masses, which form an interrupted line much nearer the edge.—*Hooker and Greville*, *Icones Filicum*, t. 63. *Nicholson*, *Dictionary of Gardening*, iv., p. 4.

T. furcata—fur-ca′-ta (forked), *Willdenow.*

According to Nicholson, this West Indian species was introduced as far back as 1824. Its fronds, 6in. to 18in. long, are produced from a somewhat creeping rhizome of a densely woolly nature. They are once or twice forked and furnished with long, narrow, spreading, entire, sharp-pointed lobes 4in. to 8in. long and about ½in. broad. These lobes are of a leathery texture, smooth on the upper surface, while their under-side is thinly clothed with minute scales. The spore masses are irregularly disposed, close to the margin, in either a continuous or an interrupted line. This and *T. blechnoides* are the only two known species with divided fronds.—*Hooker*, *Species Filicum*, v., p. 188. *Nicholson*, *Dictionary of Gardening*, iv., p. 4.

T. lanceolata—lan-cĕ-ol-a′-ta (lance-shaped), *R. Brown.*

This West Indian species is provided with a very stout, creeping rhizome, from which its simple (undivided) fronds, borne on firm, upright stalks 1in. to 2in. long, are produced. They are 6in. to 12in. long, 1in. to 2in. broad, gradually narrowed from the centre to both ends, with the edge entire but often crisped ; they are of a firm, leathery texture, naked, and their midrib is very distinct. The spore masses are disposed in either continuous or interrupted lines near the edge of the contracted upper third or quarter of the frond.—*Hooker*, *Species Filicum*, v., p. 186. *Nicholson*, *Dictionary of Gardening*, iv., p. 4.

T. marginalis—mar-gin-a′-lis (marginal), *Moore.*

This species, native of Java, is very closely related to *T. lanceolata*, from which, however, it is readily distinguished by its smaller size and by the absence of the midrib.—*Hooker*, *Synopsis Filicum*, p. 397.

T. obtusa—ob-tu′-sa (blunt), *Hooker.*

A very small-growing species, native of Borneo, with entire (undivided) fronds produced from a creeping rhizome and borne on slender, glossy, naked stalks 2in. to 3in. long. The leafy portion of the fronds, 1½in. to 2in. long and ½in. to ¾in. broad, is oblong, blunt at the summit, and rounded at the base. They are of a leathery texture, with spore masses disposed in a continuous line ⅛in. from the edge.—*Hooker*, *Species Filicum*, v., p. 186 ; *Second Century of Ferns*, t. 94.

THAMNOPTERIS—Tham-nop′-ter-is. *See* **Asplenium.**

CHAPTER XVII.

THYRSOPTERIS, *Kunze.*

(Thyr-sop′-ter-is.)

DERIVED from *thyrsos*, a bunch or raceme, and *Pteris*, a Fern, this name alludes to the fructification in the genus, which is disposed in racemose bunches. In Hooker and Baker's "Synopsis Filicum" *Thyrsopteris* forms a division of the tribe *Cyatheæ* as Genus 3. It is composed of a solitary and most interesting species, which, according to Nicholson, was introduced from Juan Fernandez Island in 1854. It is a thoroughly distinct plant, requiring only greenhouse temperature, shade, and an abundance of water at the roots. The fructification is totally different from that of any other known Fern, and consists of the two or three pairs of lower leaflets of the frond being tripinnate (three times divided to the midrib), each pinnule (leafit) becoming a raceme of stalked, cup-shaped involucres. Although fertile fronds have at various times been produced in this country and every possible attention has been paid to the sowing of their spores, there is no record of any young plants having been so raised, and the propagating of this handsome Fern has therefore been limited to the rooting of the lateral shoots which are produced on the trunk.

T. elegans—e′-leg-ans (elegant), *Kunze.*

This beautiful plant is said to produce, in its native habitats, trunks 15ft. high, but in this country we have never had the advantage of seeing

trunks or stems more than 1½ft. high. Yet even these produce fronds of large dimensions, borne on strong stalks 3ft. to 4ft. long and densely covered, especially towards their base, with long, narrow scales of a rusty-brown colour. The leafy barren portion of the fronds appears to be much divided, though only bipinnate; it is broadly triangular, of a bright green colour, and shining.



Fig. 98. Fertile Portion of Frond of Thyrsopteris elegans (nat. size).

The fertile portions, situated at their base (Fig. 98), are originally of the same colour, but, as the fructification ripens, they turn to a light brown colour, and they have all the outward appearance of miniature bunches of grapes hanging down from the stalk when the spores are ripe.—*Hooker*, *Species Filicum*, i., p. 65. *Nicholson*, *Dictionary of Gardening*, iv., p. 36.

CHAPTER XVIII.

TODEA, *Willdenow.*

(To′-dĕ-a.)

Crape Ferns.

THE plants comprised in this small genus (which is dedicated to the memory of Henry Julius Tode, an experienced mycologist living in Mecklenburg in the latter part of the eighteenth century) vary greatly in appearance and texture, some having leathery foliage of a very resisting nature, while that of most species is finely divided, very fragile, and transparent. *Todea*, which in Hooker and Baker's "Synopsis Filicum" forms Genus 63, is a division of the sub-order *Osmundaceæ*, and is divided into *Todea* proper, or *Eutodea*, of which up to this date only one species is known, and *Leptopteris*, in which section all the species with transparent or filmy foliage are contained. The species are almost confined to the South Temperate zone, and their distinctive character resides in the production and disposition of the spore masses which are contained in capsules, as in *Osmunda*, but situated on the back of the leafy portion of the frond, while the general habit of the plants is that of the *Polypodiaceæ*.

Culture.

All Todeas require greenhouse treatment, and, with the exception of *T. barbara* and its variety, which do not suffer from exposure to air and light, all are much benefited by close confinement. Indeed, condensed

moisture is absolutely necessary to their well-being, and this cannot be obtained without a close atmosphere. No sun should ever be allowed to shine on plants of the *Leptopteris* section, and the less they are disturbed at the roots the better they fare: the hot, dry atmosphere of the summer months is undoubtedly their greatest enemy. The soil in which Todeas thrive best is a compost of peat and silver sand, to which a small portion of partly-decomposed sphagnum may be added with advantage.

Todeas are easily propagated from their spores, which are produced in abundance and germinate readily when sown under favourable conditions; but they are of comparatively slow vegetation, and seedlings require a longer time than most other Ferns to form young plants.

Principal Species and Varieties.

T. africana—af-ric-a′-na (African). Synonymous with *T. barbara.*

T. arborea—ar-bor′-ĕ-a (arborescent). A common garden name for *T. barbara.*

T. barbara—bar′-bar-a (Barbary), *Moore.*

This highly decorative species, also known in gardens under the names of *T. africana*, *T. arborea*, and *T. rivularis*, is a native of New Zealand, Temperate Australia, Tasmania, Natal, and Cape Colony. It is a robust-growing plant, forming in time trunks of extraordinary thickness in comparison to their height, and producing at the same time great quantities of fronds 3ft. to 4ft. long, often 1ft. broad, on stout, erect, quite naked stalks, 1ft. or more in length. Their leaflets, closely set, spreading, 6in. to 9in. long, and 1½in. to 2in. broad, are furnished with close, narrow leafits, the edges of which are more or less distinctly toothed, while the upper ones are distinctly connected at their base. The fronds are of a leathery texture, dark green, shining, and naked on both sides. The densely-set spore masses, when mature, fill up the



Fig. 99. Barren and Fertile Pinnules of Todea barbara (nat. size).

whole under-surface of the leafits on which they are placed (Fig. 99).—*Hooker*, *Synopsis Filicum*, p. 427. *Nicholson*, *Dictionary of Gardening*, iv., p. 50.

As a decorative Fern this has few equals, especially where plants are required for very small fancy vases. Good plants of it can be grown in comparatively small pots, and its lasting qualities are unsurpassed by any other known Fern grown for the decoration of the drawing-room, it being but little affected by smoke or gas.

T. b. Vromii—Vrom′-ĭ-i (Vrom's).

For the name of this variety, which was originally introduced into England from Belgium, we cannot find any authority. The plant itself is quite distinct from *T. barbara:* its fronds are much longer, less triangular in shape, and of a pale green colour; they are borne on shorter stalks, being furnished with leaflets nearly to their base, and these are also of a longer shape and less distinctly toothed. This variety, which is a quicker grower than *T. barbara*, possesses the same decorative qualities as that useful species. In gardens it is known simply under the name of *T. Vromii.*

T. (Leptopteris) Fraseri—Lep-top′-ter-is; Fra′-ser-i (Fraser's), *Hooker and Greville.*

This species, which is the strongest-growing and also the least pellucid of all plants in the section *Leptopteris*, is a native of the Blue Mountains, Australia, where it is said to be rare, and New Caledonia. It never forms a stem, but with age produces a fibrous trunk much in the same way as Osmundas do, and this measures sometimes 1½ft. to 2ft. high. The fronds, which are distinctly bipinnate (twice divided to the midrib), are borne on firm, erect, naked stalks 6in. to 9in. long; they are often 2ft. long, 1ft. broad, and furnished with closely-set, spear-shaped leaflets 4in. to 6in. long, narrowly winged along the midrib, and divided into narrow-oblong leafits which are very sharply toothed. The general colour of the plant is a bright light green, forming a pleasing contrast with the light red colour of the stalks when young.—*Hooker and Greville*, *Icones Filicum*, t. 101. *Nicholson*, *Dictionary of Gardening*, iv., p. 50.

T. (Leptopteris) grandipinnula — Lep-top′-ter-is ; gran-dip-in′-nul-a (having large leafits), *Moore.*

Although a home-raised plant, this very remarkable Fern—undoubtedly the most transparent of the whole genus—is so very similar to *T. Moorei*, of Baker, that it is difficult, if not impossible, to distinguish one from the other. We have consequently considered it more satisfactory to reproduce Thomas Moore's description and the comments he published when the plant first made its appearance :

"This handsome Fern sprang up in one of Messrs. J. Veitch and Sons' houses, under conditions that render it probable it may be of hybrid origin ; in fact, it originated in the close neighbourhood of *T. Fraseri*, which had been standing in company with *T. hymenophylloides*, and several distinct forms were noticed among the seedlings which sprang up in this position, most of them being of a semi-depauperated character. The present, however, proved to be from the first a fast grower, with a singularly leafy development, which gives to it an aspect quite unlike that of any other known species or variety of this remarkable genus. The obvious and characteristic peculiarity of the plant is the broad leafy aspect of the fronds, in which both leaflets and leafits are very much overlapped at the edge in consequence of their free growth, both of them being broad-egg-shaped in form and unequal in development, so that both fronds and leaflets are irregular and unsymmetrical in outline. Whether it be regarded as a hybrid form with the parentage above suggested, or whether it is a foliose sport from *T. hymenophylloides*, which may possibly be the case, it is a novelty for the Fern-house, and one deserving the full appreciation of the cultivator.

"The fronds, which are broadly-egg-shaped in outline and tripinnate (three times divided to the midrib), are borne on green, circular stalks 6in. to 9in. long and almost naked. Their leafy portion, composed of sessile (stalkless) leaflets, is 1ft. to 1½ft. long, and their oblong-egg-shaped leafits, closely set and overlapping, are deeply cleft; their lobes, distinctly wedge-shaped, have their blunt extremity cut into two or three bluntish teeth or sometimes into short linear segments. The spore masses are disposed on the basal undivided portion of the veins."

To the foregoing remarks we may add that, although a fairly large batch of seedlings, all exactly resembling each other, were raised first, we have been

unable to raise any more from the spores produced on the said plants, which invariably failed to germinate.—*Thomas Moore, in Gardeners' Chronicle*, June 12, 1886, p. 752.

T. (Leptopteris) hymenophylloides—Lep-top′-ter-is ; hym-en-oph-yl-lŏ-i′-dēs (Hymenophyllum-like), *Richard and Lessert.*

This very handsome species (Fig. 100), better known in gardens under the name of *T. pellucida*, forms a thick, fibrous trunk, from which its fronds, of a very transparent nature, are produced in abundance. These fronds are borne on firm, erect stalks 6in. to 12in. long, frequently measure 2ft. in length



Fig. 100. Todea hymenophylloides, showing Habit and detached Pinnule
(Habit, much reduced; Pinnule, nat. size).

and 1ft. in breadth, and are tripinnatifid (three times divided half-way to the midrib). The dark green, spear-shaped leaflets, 4in. to 6in. long and ¾in. to 1¼in. broad, are closely set, and the lowest are of about the same dimensions as the others. The closely-set leafits, narrow-oblong in shape, ⅜in. to 1½in. long, and ¼in. broad, are cut down to the midrib into simple or forked, very narrow segments. This species is of easy cultivation and reproduces itself very readily from spores.—*Hooker, Garden Ferns*, t. 54 ; *Icones Plantarum*, t. 8. *Nicholson, Dictionary of Gardening*, iv., p. 50.



Sadleria cyatheoides
(much reduced).

T. h. compacta—com-pac′-ta (compact).

This variety, for the name of which we cannot find any authority, is far closer and denser than the type. It should be borne in mind that *T. hymenophylloides* is of a very variable nature when raised from spores, and this predisposition to variation was sufficiently illustrated by a group of a dozen or more seedlings, all different from one another, exhibited at the great Fern Conference held at Chiswick in 1890. The plants were selected from a large batch of seedlings raised at Messrs. J. Veitch and Sons' nursery, Chelsea, in 1884, and showed very strange departures, some being depauperated, while others had all their leaflets terminating in a long, tail-like process ; but none of them possessed the power of reproducing themselves, and, therefore, could not be increased.

T. intermedia—in-ter-med′-ĭ-a (intermediate), *Veitch.*

A robust-growing and very handsome form, raised in Messrs. J. Veitch and Sons' nursery, at Chelsea. It appears to be intermediate between *T. hymenophylloides* and *T. superba.* In the size, as also in the cutting of the leaflets, it agrees with the former ; but the lower leaflets, instead of being as large as the others, are very gradually reduced, as is the case in *T. superba*, and their stalks are densely covered with short, woolly hairs. The same plant has evidently made its appearance spontaneously in New Zealand, as may be gathered from a note in *Hooker's Synopsis Filicum*, p. 428, and also from *L'Illustration Horticole*, t. 90. It reproduces itself fairly true from spores.

T. (Leptopteris) Moorei—Lep-top′-ter-is ; Moor′-e-i (Moore's), *Baker.*

A beautiful species, native of Lord Howe's Island. Its broadly-oblong fronds, 1½ft. to 2ft. long, including the stalk, and 1ft. broad, are furnished with overlapping, spear-shaped, stalkless leaflets 1½in. to 2in. broad. The leafits, also stalkless and spear-shaped, are very closely set and are cut down nearly to the stalks into bluntish, strap-shaped lobes toothed on the outer edge. The fronds are naked on both surfaces, their texture is thicker than in the other species, and the oblong spore masses are placed against the midrib near the base of the leafits.—*Hooker, Synopsis Filicum*, p. 524.

T. (Leptopteris) pellucida—Lep-top′-ter-is ; pel-lu′-cid-a (transparent).

Synonymous with *T. hymenophylloides.*

T. (Leptopteris) plumosa—Lep-top′-ter-is ; plu-mo′-sa (feathery), *Moore.*

A very pretty seedling, raised in Messrs. J. Veitch and Sons' nursery, where a considerable number of plants of identical character, but differing from the supposed parent, have been obtained from a sowing of *T. superba.* We can only suppose they are accidental hybrids, brought into existence by the casual intermixture of spores of some other Todea with those which were purposely sown. *T. plumosa* is of dwarf, compact habit, and of a pale green colour when young. The surface of the fronds is moderately bristly with the small, erect segments, as in *T. intermedia*, but the fronds are shorter and



Fig. 101. Todea superba
(much reduced).

more egg-shaped, and the stalks are also wanting in the woolly nature which is peculiar to that plant.—*Thomas Moore in Gardeners' Chronicle*, May 4, 1878, p. 565.

T. rivularis—ri-vul-a′-ris (brook-loving). Synonymous with *T. barbara.*

T. (Leptopteris) superba—Lep-top′-ter-is ; sup-erb′-a (superb), *Colenso.*

This remarkable plant, known in gardens as the "Crape Fern," the "Prince of Wales's Feather Fern," and the "New Zealand Filmy Fern," is undoubtedly the most striking as well as the most beautiful species

known (Fig. 101). Although gathered by Forster in New Zealand, during Captain Cook's voyage, it appears to have remained unknown to any other botanist until the Rev. W. Colenso detected it, in 1838, on the Tongarou Mountain, and again in 1841 on the mountain range near Waikare Lake, where it was growing luxuriantly in decomposed leaf-soil. It is said to inhabit principally the dells of the shaded forests of the Northern Island, New Zealand: there the specimen in Hooker's Herbarium was gathered by Forster, to whom, as truly remarks Sir W. J. Hooker, the discovery of this beautiful plant is really due.

T. superba does not form a stem, but produces a somewhat erect, fibrous trunk, of a woody nature in the interior, reaching at the most 1½ft. in height. Its handsome fronds, 2ft. to 4ft. long and 6in. to 10in. broad, are borne on firm, erect stalks 2in. to 3in. long; they are tripinnatifid (divided three times nearly to the midrib), and their narrow, spear-shaped leaflets are closely set, the central ones being 4in. to 5in. long and the lower ones gradually reduced. The leafits are divided into simple or forked, linear segments, and the stalks of the leaflets are densely woolly underneath.—*Hooker*, *Icones Plantarum*, t. 910; *Second Century of Ferns*, t. 10. *Nicholson*, *Dictionary of Gardening*, iv., p. 50.

T. Vromii—Vrom′-ĭ-i (Vrom's). A variety of *T. barbara.*

T. (Leptopteris) Wilkesiana—Lep-top′-ter-is; Wilkes-ĭ-a′-na (Wilkes'), *Brackenridge.*

This beautiful and very rare, miniature Tree Fern, native of Fiji and the New Hebrides, was first discovered by a botanist attached to the United States Exploring Expedition in Ovolau, one of the Fiji Islands, where it was found growing in humid mountain forests. It is closely allied to *T. Fraseri*, but is of larger growth, with an arborescent habit, and has the lower leaflets distinct and deflexed and the stalk of a more or less hairy nature. Mr. Baker classes it as a variety of *T. Fraseri*, but the two plants are sufficiently distinct for all garden purposes.

Mr. Brackenridge describes the trunk as being from 18in. to 20in. high and 1½in. in diameter, scaly towards the top, and producing near the base black, wiry roots about the thickness of a crow-quill, the surface of

the trunk being roughened by the raised scars of fronds that have fallen off. The summit is crowned by from ten to twelve spreading fronds 2ft. or more in length, 1¼ft. wide at their broadest part, and broadly spear-shaped. The leaflets are sessile (stalkless), oblong-spear-shaped, spreading, the two or three lower pairs distant and deflexed. The pinnules (leafits) are blunt-oblong, obliquely wedge-shaped at the base, toothed, transparent, and marked with numerous small, brown spots. The stalks of the leaflets are winged and clothed with short hairs. The slender, tree-like habit of the plant gives it quite a distinct aspect amongst its allies. This interesting species, which requires a little warmer treatment than the others, was introduced in 1870.—*Thomas Moore in Gardeners' Chronicle*, June 11, 1870, p. 795.

TRICHOCARPA—Trich-oc-ar'-pa. *See* **Deparia.**

CHAPTER XIX.

TRICHOMANES, *Smith.*

(Trich-om′-an-ēs.)

Bristle Ferns.

THE name *Trichomanes* is the old Greek one used by Theophrastus, and derived from *thrix*, *trichos*, a hair, and *manos*, soft, in allusion either to the delicate nature of the fronds, or more probably to the peculiar soft, hairy nature of the rhizomes with which the majority of the species are provided. In Hooker and Baker's "Synopsis Filicum," *Trichomanes* forms an important part of the tribe *Hymenophylleæ* as Genus 17. It was formerly divided into *Cephalomanes*, *Crepidomanes*, *Didymoglossum*, *Feea*, *Hemiphlebium*, *Hymenostachys*, *Involucraria*, *Lacostea*, *Lecanium*, *Microgonium*, *Phlebiophyllum*, &c. Most of the foregoing names were given by the late Dr. Van den Bosch, who made a special study of the tribe; his "Hymenophyllaceæ Javanicæ" contains engravings of many of the species, which, in point of beauty and delicacy of execution, have rarely been equalled. The tribe *Hymenophylleæ* was, by Van den Bosch, divided into 24 genera, and comprised no less than 450 so-called species; but the various characters which he held as distinctive were of so superficial a nature that none of his species have been maintained, and the tribe, as at present constituted, comprises only three genera: *Hymenophyllum*, *Loxsoma*, and *Trichomanes*.

This genus is composed of about 100 species of Ferns, inhabiting tropical and temperate regions; in fact, the geographical range of the

species may be said to be very similar to that of *Hymenophyllum*, to which, so far as outward appearances only are concerned, Trichomanes bear a very great resemblance. The plants forming this genus also agree with the Hymenophyllums in habit of growth and in delicacy of texture, the character furnished by the shape of the involucre dividing a very natural tribe into two nearly equal halves. In *Trichomanes*, as in *Hymenophyllum*, the fronds vary in shape and cutting from simple (undivided) to decompound-multifid (many times divided), and the sori (spore masses) are marginal, always terminating a vein, and more or less sunk in the frond. The involucre and receptacle, however, are different: the former is tubular, closely corresponding with the frond in texture, with its mouth either truncated, winged, or slightly two-lipped; the latter, as fine as a thread, is elongated, often extending considerably beyond the mouth of the involucre, and shows, especially at the base, some stalkless, depressed capsules surrounded by an entire, broad, nearly transverse ring, bursting vertically.

In the "Synopsis Filicum," the genus *Trichomanes* is divided into two sub-genera as follow:

Feea (Fe′-ĕ-a), *Van den Bosch.* The plants in this sub-genus produce barren and fertile fronds entirely distinct. While the former are pinnatifid (deeply cleft nearly to the midrib), the latter consist simply of a narrow, distichous spike, formed of two rows of spore masses regularly disposed on the two opposite sides of a common axis or midrib.

Eutrichomanes (Eu′-trich-om′-an-ēs), or true *Trichomanes.* This, as stated in the "Synopsis Filicum" (p. 72), includes numerous genera of Presl and Van den Bosch, founded primarily on the texture of the frond (whether it is composed of one or of more than one layer of cellules); secondarily, upon whether the mouth of the involucre is entire or two-lipped; and, thirdly, on the degree to which the frond is divided and the character of the venation. *Eutrichomanes* is by far the most important sub-genus; it is composed of plants with barren and fertile fronds uniform or nearly so, and comprises:

(1) Plants with fronds entire or slightly lobed, without a distinct central midrib, the veins radiating from the base in a fan-like manner. This section is best represented by the popular "New Zealand Kidney Fern," *T. reniforme.*

(2) Plants with fronds entire or slightly lobed, but provided with a central midrib extending from the base to the summit. The North American *T. Petersii* is perhaps the best illustration of the character of this section.

(3) Plants with fronds entire below, palmate or digitate (hand-shaped or fingered) above. The pretty little Japanese and Indian *T. parvulum* is an excellent example of this section.

(4) Plants with fronds more or less deeply cleft, but not truly pinnate, and with the main rachis (stalk) distinctly winged throughout. *T. alatum* is the best representative of this section.

(5) Plants with fronds more or less deeply cleft, but not truly pinnate, and with the main rachis hardly, if at all, winged in the lower part. The most distinct illustration of the character of this section is found in the "Killarney Fern," *T. radicans*.

(6) Plants in which the main rachis is quite free or only very slightly winged towards the summit, the fronds are simply pinnate, and their leaflets are not divided. The characters of this section are well shown in *T. pinnatum*.

(7) Plants in which the main rachis is quite free or only very slightly winged towards the summit, the fronds are decompound (much-divided), slender, and flaccid, and their ultimate segments are very narrowly linear or filiform (thread-like). *T. trichoideum* well illustrates this section.

(8) Plants with decompound fronds, borne on a main rachis of a rigid nature, with their ultimate segments of a somewhat leathery texture, which characters are well shown in *T. maximum*.

The genus *Trichomanes* is represented in Great Britain by a solitary plant, *T. radicans*, and there are no other species known to be native of Europe.

Culture.

With the exception of a few species which undoubtedly require more than greenhouse temperature, the Trichomanes may without danger be submitted to the treatment recommended for Hymenophyllums (see Vol. II., p. 300). When not otherwise stated in the descriptions of the species, they may be considered as thriving under the cool treatment recommended for Filmy Ferns generally. To the particulars which have already appeared in Vol. I. (pp. 73 to 81) respecting the culture of Filmy Ferns we may add that, whereas we do not

advocate for either Hymenophyllums or Todeas the use of stone, this material is essential to the well-being of certain *Trichomanes.*

As will be noticed in the descriptions of the species here given, many of the plants are provided with rhizomes, and these are in most instances of a very different nature from those of Hymenophyllums, as the greater part of them possess a very strongly-marked power of adhesion: it is for these species especially that the stone is necessary. While some of the kinds with slender, though equally hairy rhizomes, such as *T. humile*, *T. pyxidiferum*, *T. trichoideum*, and *T. venosum*, which in their natural habitats are usually found clothing Tree-fern stems, prefer rambling through decaying vegetable matter, others, also provided with very slender rhizomes, prefer sandstone, or stone of a very porous and soft nature—this is particularly the case with such species as *T. Colensoi*, *T. exsectum*, *T. parvulum*, *T. tenerum*, &c. It has been noticed, however, that species provided with stout, hairy, creeping rhizomes, such as *T. javanicum* and *T. radicans*, thrive best when in close proximity to stone of a harder nature, to which they will cling with great tenacity. Where necessary these peculiarities will be mentioned with the plants described. It may be well to note here that whenever stone is used it is necessary that a little peat of a sandy-fibrous nature should be placed at its base to establish the plant.

As regards light, moisture, and ventilation, we need not here repeat what has already been stated in the chapter specially devoted to Filmy Ferns in Vol. I. (pp. 73 to 81), as the particulars there given are all that is requisite for the successful culture of these plants.

The propagation of Trichomanes is usually effected by division of the rhizomes, although it also sometimes takes place by means of proliferous buds. For instance, *T. pinnatum* is conspicuously proliferous at the extremity of its fronds, where, when touching the ground, they frequently root of their own accord. In the same way a form of *T. radicans*, named *proliferum*, found in Ireland, may be increased by the rooting of the bulbils produced on the upper surface of its fronds. Trichomanes may also be propagated by means of spores, but this is a somewhat tedious process; in 1886 a batch of several hundred young *T. radicans* were raised in that way in Messrs. J. Veitch and Sons' nursery at Chelsea, and, strange as it may appear, the species reproduced itself without any noticeable deviation whatever from the normal form. The



Views of a Fern-House in Mr. H. B. May's Nursery, Upper Edmonton.

young plants thus produced had a much handsomer appearance than those resulting from the division of the rhizomes, as they grew more symmetrically and also more vigorously, but this hardly compensated for the length of time which seedlings take to develop, for the plants which in 1886 were only in 2½in. pans were produced from spores sown on turfy peat in 1882. The experiment, however, was interesting from the fact that the young subjects thus obtained under artificial conditions were the first of which there is any record, and they conclusively proved that, with a certain amount of patience, Trichomanes may, like most other Ferns, be propagated from spores, especially when these can be gathered and sown immediately.

Principal Species and Varieties.

T. achilleæfolium—ach-ill-e′-æ-fol′-ĭ-um (Achillea-leaved). Synonymous with *T. rigidum.*

T. alabamense—al-ab-a-men′-sĕ (from Alabama). A variety of *T. radicans.*

T. alatum—al-a′-tum (winged), *Swartz.*

This beautiful Fern, native of the West Indies and Brazil, is very variable in dimensions and hairiness. Its more or less broadly spear-shaped fronds, 3in. to 12in. long, 1in. to 4in. broad, and borne on tufted stalks 2in. to 4in. long and winged above, are two or three times cleft nearly to the midrib, with leaflets cut in the same way and lobes often again sharply toothed; they are of a delicately membranous texture, and of a very transparent pale green colour, which produces a charming effect when the fronds are laden with moisture. This species, also known as *T. attenuatum*, thrives best on a piece of Tree-fern stem.—*Hooker*, *Species Filicum*, i., p. 123. *Hooker and Greville*, *Icones Filicum*, t. 21. *Nicholson*, *Dictionary of Gardening*, iv., p. 80.

T. anceps—an′-ceps (double). Synonymous with *T. Prieurii.*

T. angustatum—an-gus-ta′-tum (narrowed). The plant usually met with in gardens under this name is *T. tenerum.*

T. apiifolium—ap′-ĭ-if-ol′-ĭ-um (Apium-leaved), *Presl.*

This species resembles the better-known *T. maximum* in general outline, but it is of more graceful habit, the texture of its fronds is more delicate, and the involucres are much smaller and shorter, being almost like those of *Hymenophyllum.* It is a native of the Philippine Islands and Polynesia, and its fronds sometimes attain nearly 2ft. in length, including their dark, strong, hairy stalks.—*Hooker, Species Filicum*, i., p. 137. *Nicholson, Dictionary of Gardening*, iv., p. 80.

T. assimile—as-sim′-il-ĕ (assimilated), *Mettenius.*

A small-growing species, native of Aneiteum, producing from a slender rhizome oblong-spear-shaped fronds 2½in. long, 1in. broad, three times deeply cleft, and proliferous from the stalk, which is about 1½in. long and winged throughout.—*Hooker, Synopsis Filicum*, p. 464.

T. attenuatum—at-ten-ŭ-a′-tum (attenuated). Synonymous with *T. alatum.*

T. auriculatum—aur-ic-ul-a′-tum (eared), *Blume.*

This is one of the loveliest of Ferns; it has a remarkably extensive habitat, being found in Japan, Formosa, Northern Hindostan, the Philippines, Java, and Guiana, where, according to Backhouse, it climbs on rocks, and also to the tops of the loftiest trees. Its fronds, which are almost stalkless, 6in. to 12in. long, 1½in. to 2in. broad, and twice divided nearly to the midrib, are produced from strong, wide-creeping rhizomes, and have their rachis (stalk of the leafy portion) very slightly winged throughout or above only. They are composed of shortly-stalked leaflets, obliquely wedge-shaped at the base, and exquisitely transparent. This plant is also known in gardens under the name of *T. dissectum.—Hooker, Synopsis Filicum*, p. 82. *Nicholson, Dictionary of Gardening*, iv., p. 80. *Beddome, Ferns of British India*, t. 182.

T. Bancroftii—Ban-crof′-tĭ-i (Bancroft's), *Hooker and Greville.*

A dwarf species, with wavy, crispy, transparent fronds, 3in. to 6in. long and 1in. broad, and borne on stalks that are 1in. to 2in. long and broadly winged to the base; they are broadly egg-shaped, and deeply cleft into oblong, blunt, notched segments, usually overlapping (Fig. 102) and of a deep

green colour. This species is a native of Jamaica, Peru, Brazil, and British Guiana.—*Hooker and Greville*, *Icones Filicum*, t. 204. *Nicholson*, *Dictionary of Gardening*, iv., p. 80. *Lowe*, *Ferns British and Exotic*, viii., t. 9G.

T. Barklianum — Bark-lĭ-a′-num (Barkly's), *Baker.*



Fig. 102. Portion of Fertile Frond of Trichomanes Bancroftii (nat. size).

This species, which in the "Synopsis Filicum" is given as "a very interesting novelty, the discovery of which we owe to Sir Henry Barkly, the Governor of Mauritius, and Lady Barkly, who found it at Tamari Cascade, Mauritius," is one of the very smallest known; its little fronds, narrow-oblong, entire, and undulated at the edge, seldom reach ½in. in length, including their short stalks.—*Hooker*, *Synopsis Filicum*, p. 74.

T. bicorne—bic-or′-nĕ (having two horns), *Hooker.*

This species, which in some respects resembles *T. alatum*, is found growing on logs or roots of trees, in the dense, moist forests of the Amazon, and at St. Gabriel, Rio Negro; it is also plentiful on decayed logs on the Catingas, North of Brazil. Its strong rhizome is scarcely creeping, and its egg-shaped fronds, 2in. to 3in. long and 1in. to 1½in. broad, are twice or three times deeply cleft to a narrow-winged stalk. The remarkable feature in this species is the involucre, which is sunk between the two horns as it were of the apex of a segment. *T. bicorne* requires a warm temperature.—*Hooker*, *Icones Plantarum*, t. 982; *Second Century of Ferns*, t. 82.

T. bipunctatum—bip-unc-ta′-tum (two-dotted), *Poiret.*

A distinct species, known also under the names of *T. capillatum* and *T. Filicula*. It has a very wide range of habitat, being found in Mauritius, Bourbon, Madagascar, Natal, Assam, Japan, Ceylon, Java, Borneo, &c. It is provided with a wide-creeping, slender rhizome, from which its egg-shaped fronds, borne on naked stalks 1in. to 2in. long and slightly winged above, are produced; they are three times deeply cleft, and their rachis (stalk of the leafy portion) is winged throughout.—*Hooker*, *Synopsis Filicum*, p. 81. *Nicholson*, *Dictionary of Gardening*, iv., p. 80. *Beddome*, *Ferns of British India*, t. 283.

T. (Feea) botryoides—Fe′-ĕ-a ; bot-rў-ŏ-i′-des (bunch-like), *Kaulfuss.*

This species, also known as *Feea nana*, produces from its somewhat upright, tufted rootstock, barren and fertile fronds, which are totally distinct. The former, 2in. to 3in. long, 1in. or more in breadth, and borne on very short stalks, are deeply cleft to a slightly-winged stalk, their extremity rooting and very proliferous. The fertile fronds are 1in. to 2in. long and narrow ; usually their upper part only is of a leafy nature.—*Hooker*, *Species Filicum*, i., p. 115. *Nicholson*, *Dictionary of Gardening*, iv., p. 80.

T. brachypus—brach′-yp-us (short-footed), *Kunze.*

Partly-decayed wood suits this species, which is a native of Tropical America, being found from the West Indian Islands southward to Peru and the South of Brazil. Its long, wide-creeping rhizome, of a wiry nature, produces nearly stalkless fronds 3in. to 6in. long, 1½in. broad, and cut down to a broadly-winged stalk into oblong, blunt, nearly entire, and very transparent leaflets.—*Hooker*, *Species Filicum*, i., p. 121.

T. brevipes—brev-ip′-ēs (short-footed), *Baker.*

The rhizome in this Philippine Islands species is woolly and provided with numerous short-branched rootlets. Its broadly egg-shaped fronds, almost stalkless and 2in. to 3in. long, are fully pinnate or have their rachis slightly winged at the summit ; their lowest leaflets are again deeply cleft into narrow segments of a very transparent nature.—*Hooker*, *Synopsis Filicum*, i., p. 140 ; *Icones Plantarum*, t. 705.

T. brevisetum—brev-is-e′-tum (having short bristles). Synonymous with *T. radicans.*

T. capillatum—cap-il-la′-tum (hairy). Synonymous with *T. bipunctatum.*

T. caudatum—cau-da′-tum (tailed), *Brackenridge.*

An elegant little species, native of the Fiji Islands, Tahiti, and New South Wales. It is closely allied to the better-known *T. tenerum*, from which, however, it is readily distinguished through its stronger habit, its darker colour, and its broader though more divided leaflets.—*Hooker*, *Synopsis Filicum*, p. 85.

T. Colensoi—Col-en′-sŏ-i (Colenso's), *Hooker*.

This elegant, delicate-looking species, of a particularly slender nature, was first discovered in the interior of the Northern Island, New Zealand, by the Rev. W. Colenso, who states that he found it growing profusely on the deep sides of a dark ravine on the banks of a rivulet, which meandered through the dense and ever-humid forest of the mountainous region between Waikare Lake and Rua Tahuna. Its wide-creeping, slender rhizome is naked, and its oblong-spear-shaped fronds, 2in. to 4in. long, are borne on naked stalks 1in. long; they are fully pinnate, with distant, stalked leaflets cut down quite to the stalks, and very narrow segments. This species grows best on porous stone.—*Hooker*, *Synopsis Filicum*, p. 85; *Second Century of Ferns*, t. 79.

T. crinitum—cri-ni′-tum (hairy), *Swartz*.

This species, native of the West Indies and the Andes of Ecuador, is very distinct on account of the hairy character of its foliage, the slender stalks of its fronds being as hairy as the leaflets, which reach down very nearly to the rachis and are cut about half-way down into narrow segments with ciliated margins. This plant thrives best on wood.—*Hooker*, *Species Filicum*, i., p. 131. *Nicholson*, *Dictionary of Gardening*, iv., p. 80.

T. crispum—cris′-pum (curled), *Linnæus*.

According to Lowe, this very handsome and distinct species, native of South and Tropical America and the West Indies, was first introduced into the Royal Gardens, Kew, in 1851. Its fronds, 4in. to 12in. long and 1½in. to 2in. broad, are produced from a short rhizome and borne on strong, wiry, woolly stalks 2in. to 6in. long; they are spear-shaped, remarkably transparent, and simply pinnate. The leaflets are 1in. long, blunt, oblong, spreading or even deflexed, and bear a few stiff hairs on their edges. This species requires stove temperature, and prefers wood to grow upon. —*Hooker and Greville*, *Icones Filicum*, t. 12. *Nicholson*, *Dictionary of Gardening*, iv., p. 80. *Lowe*, *Ferns British and Exotic*, viii., t. 10A.

T. curvatum—cur-va′-tum (curved). The plant known by this name is identical with *T. javanicum*.

T. digitatum—dig-it-a′-tum (having fingers), *Swartz.*

This small species, native of Mauritius, Bourbon, and Java, is very distinct, its fronds, irregular in general outline, being divided nearly to the base or to a broadly-winged rachis into long, broadly-branched segments. It succeeds best on porous stone.—*Hooker*, *Species Filicum*, i., p. 119. *Beddome*, *Ferns of British India*, t. 301.

T. dissectum—dis-sec′-tum (dissected). Synonymous with *T. auriculatum.*

T. (Feea) elegans—Fe′-ĕ-a ; e′-leg-ans (elegant), *Rudge.*

A most distinct species, producing from a tufted rootstock barren and fertile fronds of totally different characters. The former, of a drooping character, are pinnatifid, 6in. to 8in. long, 2in. broad, and borne on stalks 2in. to 3in. long ; they are broadly spear-shaped, with leaflets nearly horizontal, crowded, somewhat sickle-shaped, finely toothed along their edges, and frequently terminating in a tail-like process proliferous at the extremity. The fertile fronds, 6in. to 12in. long and of erect habit, are extremely narrow and undivided, seldom ½in. broad, and fringed on each side with coarse, hair-like, slender spore-receptacles. The plant is a native of Tropical America, from Trinidad and Mexico southward to Peru.—*Hooker*, *Species Filicum*, i., p. 114. *Lowe*, *New and Rare Ferns*, t. 64B.

T. elongatum—e-long-a′-tum (lengthened). A variety of *T. rigidum.*

T. ericoides—er-ic-ŏ-i′-des (Erica-like), *Hedwig.*

A very singular plant, native of Borneo, Java, Samoa, and Bourbon, and requiring a higher temperature than most other species. Its curious-looking fronds, 3in. to 8in. long, 2in. to 2½in. broad, are produced from a strong, wiry rhizome of a woolly nature, and borne on upright stalks 1in. to 4in. long, wiry, and not at all winged. Their leaflets and leafits spread in all directions and are not at all flattened. *T. longisetum* is another name for this species.—*Hooker*, *Synopsis Filicum*, p. 87.

T. erosum—e-ro′-sum (bitten). Synonymous with *T. muscoides.*

T. exsectum—ex-sec′-tum (cut out), *Kunze.*

A lovely species, native of Juan Fernandez and Southern Chili, where it is said to grow hanging from the roofs of damp caverns. The fronds,

6in. to 12in. long, produced from a wide-creeping, slender rhizome, are extremely delicate and membranous, and resemble thin, flat, much-branched, green sea-weed. Their segments are narrow, smooth, either simple or forked, and blunt. The plant thrives equally well on hard wood or stone.—*Hooker*, *Synopsis Filicum*, p. 85. *Lowe*, *New and Rare Ferns*, t. 64A.

T. Filicula—Fil-ic′-ul-a (little Fern). Synonymous with *T. bipunctatum.*

T. fimbriatum—fim-brĭ-a′-tum (fringed). A synonym of *T. superbum.*

T. floribundum—flo-rib-un′-dum (bundle-flowered). Synonymous with *T. pinnatum.*

T. fœniculaceum—fœ-nic-ul-a′-cĕ-um (Fennel-like), *Bory.*

This species, of medium dimensions, is a native of Mauritius, Bourbon, Borneo, and Rockingham Bay, Australia. Its fronds, borne on slightly-tufted, erect, wiry stalks 2in. to 4in. long, are 4in. to 8in. long, 2in. to 3in. broad, erect, rigid, and broadly egg-shaped; their lower leaflets, about 1½in. long, are cut down nearly or quite to the stalk, and are divided into deeply-cleft leafits, which in their turn are cut into thread-like segments.—*Hooker*, *Species Filicum*, i., p. 135.

T. gemmatum—gem-ma′-tum (bud-bearing), *J. Smith.*

A species having a strong, wiry rhizome covered with numerous long, black, wiry fibres, from which are produced its upright, broadly egg-shaped fronds, 2in. to 6in. long, 1in. to 2in. broad, and borne on wiry stalks 1in. to 3in. long and winged above. The leaflets are cut down to a narrowly-winged rachis into leafits with deeply-forked, thread-like segments. This species is a native of South America and Malaysia.—*Hooker*, *Species Filicum*, i., p. 135. *Nicholson*, *Dictionary of Gardening*, iv., p. 80.

T. giganteum—gig-an-te′-um (gigantic), *Bory.*

This species, native of Mauritius, Bourbon, Malaysia, the Fiji Islands, &c., is very handsome and one of the most distinct of the genus. Its fronds, which are produced from a wide-creeping rhizome of a woolly nature, and borne on strong, upright stalks 4in. to 6in. long, are egg-shaped and distinctly quadripinnatifid (four times cleft almost to the rachis); they

measure 1ft. to 1½ft. in length and 6in. to 9in. in breadth. The leafits are cut down very nearly to the rachis, and their divisions are again deeply pinnatifid. The ultimate segments, very narrow and distinctly flattened, are dark green and shining, though very transparent.—*Hooker*, *Species Filicum*, i., p. 137 ; *Icones Plantarum*, t. 702.

T. Hartii—Hart′-ĭ-i (Dr. Hart's), *Baker*.

A finely-divided species, native of Sierra Leone. Its fronds are borne on stalks that are 2in. to 4in. long, and winged at the upper part ; they are 3in. to 6in. long, and composed of from eight to twelve pairs of stalkless leaflets, the ultimate segments of which are oblong and blunt.—*Hooker*, *Synopsis Filicum*, p. 80.

T. hispidulum—his-pid′-ul-um (slightly hairy), *Mettenius*.

From a sub-erect, woody rootstock, this species, native of Borneo, produces its triangular fronds, which are 6in. to 12in. long, and borne on winged stalks 3in. to 6in. long. The main rachis is narrowly winged throughout, and the closely-set, triangular leaflets are dark olive-green.—*Hooker*, *Synopsis Filicum*, p. 466.

T. humile—hum′-il-ĕ (dwarf), *Forster*.

Though of small dimensions, this species, native of Java, New Zealand, and the Pacific Islands, is very interesting. Its tiny, creeping, deeply-intermatted rhizomes produce in abundance oblong-spear-shaped fronds, which are 1in. to 2in. long, ½in. broad, and twice deeply cleft nearly to the midrib into simple or once-forked, narrow lobes. They are of a very transparent nature, and form a dense mat when grown on a piece of dead Tree Fern.—*Hooker and Greville*, *Icones Filicum*, t. 35. *Nicholson*, *Dictionary of Gardening*, iv., p. 80.

T. incisum—in-ci′-sum (cut). Synonymous with *T. sinuosum*.

T. intramarginale—in-tra-mar-gin-a′-lĕ (margined within), *Hooker and Greville*.

A small-growing species, native of Ceylon, with slender, wide-creeping, woolly rhizomes, from which oblong-spear-shaped fronds, 1in. to 2in. long



Selaginella inæqualifolia perelegans, showing Habit of Plant and Portion of detached Stem

(Habit, $\frac{1}{3}$ nat. size; Portion of Stem, $\frac{1}{2}$ nat size).

and twice cleft nearly to the midrib, are produced. The segments, few in number and narrow, are either simple or forked, and of a somewhat leathery texture.—*Hooker and Greville*, *Icones Filicum*, t. 211. *Hooker*, *Synopsis Filicum*, p. 79. *Beddome*, *Ferns of Southern India*, t. 208.

T. javanicum—ja-van′-ic-um (Javanese), *Blume*.

This very distinct species, also known as *T. curvatum*, is a native of Malaysia, Borneo, Java, and Madagascar. Its rootstock, of a tufted nature, is provided with numerous strong, wiry roots. The broadly-spear-shaped fronds, 2in. to 8in. long and 1in. to 2in. broad, are borne on wiry, upright stalks 1in. to 4in. long, sometimes naked, sometimes woolly; they are once fully pinnate, with the leaflets often 1in. long, oblong, blunt or sharp-pointed, obliquely wedge-shaped at the base, and finely toothed (Fig. 103, reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author). Although their texture is somewhat leathery, the fronds are beautifully transparent.—*Hooker and Greville*, *Icones Filicum*, t. 240. *Nicholson*, *Dictionary of Gardening*, iv., p. 80. *Beddome*, *Ferns of British India*, t. 180.



Fig. 103. Trichomanes javanicum (½ nat. size).

T. Kaulfussii—Kaul-fus′-sĭ-i (Kaulfuss'), *Hooker and Greville*.

A very distinct species, native of the West Indies, Guiana, and North Brazil. Its broadly-spear-shaped fronds, 4in. to 12in. long and 1½in. to 2in.

broad, are produced from a wide-creeping, strong, woolly rhizome; they are deeply cleft nearly to the broadly-winged stalk, and are borne on strong, compressed stalks 2in. to 4in. long and winged above, their main rachis (stalk of the leafy portion) being densely and the surface of the lobes slightly hairy. This species requires a higher temperature than most of the Trichomanes in cultivation. — *Hooker and Greville*, *Icones Filicum*, t. 10. *Nicholson*, *Dictionary of Gardening*, iv., p. 81. *Lowe*, *New and Rare Ferns*, t. 63B.

T. Kraussii—Kraus′-sĭ-i (Dr. Krauss'), *Hooker and Greville.*

This is a small, elegant, creeping Fern, native of Guiana and the West Indian Islands, where it grows on trunks of trees. It is of upright habit, with fronds 1in. to 3in. long, oblong, narrower at the base than in their centre, and cut down to a winged stalk into oblong, stalkless lobes that are deeply toothed or cleft and of a very transparent nature (Fig. 104).—*Hooker and Greville*, *Icones Filicum*, t. 149. *Nicholson*, *Dictionary of Gardening*, iv., p. 81. *Lowe*, *New and Rare Ferns*, p. 164.



Fig. 104. Mature Fertile Fronds of Trichomanes Kraussii (⅔ nat. size).

T. Kunzeanum—Kunz-ĕ-a′-num (Kunze's). A variety of *T. radicans.*

T. labiatum—lab-ĭ-a′-tum (lipped), *Baker.*

In this species, native of British Guiana, the fronds are variable in shape, roundish and heart-shaped at one or both ends, or somewhat egg-shaped and narrowed at the summit; they are of a dark green colour, yet quite transparent, and the fertile ones show a distinct midrib.—*Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. Lambertianum—Lam-bert-ĭ-a′-num (Lambert's), *Hooker.*

This species, native of Peru, is a singular plant, for its narrow-oblong fronds, borne on stout stalks 4in. to 5in. long and densely clothed with long, fine, reddish-brown hairs, are provided with very closely-crowded leaflets and segments cut more than half-way to the rachis, which is densely woolly.—*Hooker*, *Synopsis Filicum*, p. 83.

T. Leprieurii—Le-prieur′-ĭ-i (Le Prieur's). Synonymous with *T. Prieurii.*

T. longisetum—long-is-e′-tum (having a long bristle). Synonymous with *T. ericoides.*

T. lucens—lu′-cens (shining), *Swartz.*

A very distinct species, native of Tropical America, with rootstock scarcely creeping. Its oblong-spear-shaped fronds, borne on stout, tufted stalks 2in. to 4in. long and densely clothed with long, fine, rusty-coloured hairs, are 6in. to 18in. long, 2in. to 4in. broad, and fully pinnate. The leaflets are very closely set, often overlapping, are cut about half-way to the midrib, and are of a delicately transparent nature.—*Hooker*, *Species Filicum*, i., p. 139, t. 41A.

T. Luschnatianum — Lusch-nat-ĭ-a′-num (Luschnat's). A variety of *T. radicans.*

T. macilentum—mac-il-en′-tum (thin), *Van den Bosch.*

A native of Trinidad, Demerara, and the northern provinces of Brazil. It is closely allied to *T. Bancroftii*, from which, however, it may easily be distinguished by the more divided nature of its fronds, which are 2in. to 6in. long, and also by its creeping rhizome.—*Hooker and Greville*, *Icones Filicum*, t. 204.

T. maximum—max′-im-um (greatest), *Blume.*

This is a very strong-growing species, native of Java, Borneo, and the Polynesian Islands. Its handsome, erect, egg-shaped fronds, 1ft. to 1½ft. long and 6in. to 9in. broad, are borne on strong, erect stalks 3in. to 6in. long, and are four times divided nearly to the midrib. The broadly-spear-shaped leaflets sometimes measure 6in. in length and 2in. in breadth, and the leafits, 1in. or more in length, are cut down to the stalk into segments, which are again deeply cleft, of a somewhat rigid texture, dark green in colour, and very transparent. This species succeeds equally well on wood or on stone of a porous nature, but requires a little higher temperature than most of the Trichomanes in cultivation.—*Hooker*, *Species Filicum*, i., p. 137. *Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. meifolium—me-if-ol′-ĭ-um (Spignel-leaved), *Backhouse.*

One of the most beautiful of all Filmy Ferns. Its noble plumes of tufted fronds are fully 2ft. high; they are spear-shaped and very finely divided,

being cut into slender, linear segments, some of which standing forward, as in the well-known *Todea superba*, give the whole plant an effect of almost incomparable softness and richness. It is a native of the mountains of Java, where it occurs at elevations varying between 4000ft. and 7000ft.—*Backhouse's Catalogue of Filmy Ferns*, 1871, p. 17.

T. membranaceum—mem-bra-na′-cĕ-um (membranous), *Linnæus.*

This species, native of Tropical America, is of most singular appearance. Its nearly stalkless fronds, of a thin and transparent nature and nearly round, are 2in. to 3in. broad and more or less deeply cut from the circumference towards the centre, with rounded lobes conspicuously scaled on their margins —a character unique in the genus. This plant succeeds best on porous stone.—*Hooker*, *Species Filicum*, t. 115. *Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. Morierii—Mor-ier′-ĭ-i (Morier's). Synonymous with *T. trichophyllum.*

T. muscoides—mus-cŏ-i′-des (moss-like), *Swartz.*

This species, native of Tropical America, Asia, Polynesia, and Africa, is also known as *T. erosum.* It produces from a slender rhizome shortly-stalked fronds 1in. to 3in. long, ¼in. to ½in. broad, varying in shape from linear-oblong to spoon-shaped, nearly entire or bluntly lobed, especially above. —*Hooker*, *Species Filicum*, i., p. 117. *Beddome*, *Ferns of British India*, p. 304.

T. (Feea) nanum—Fe′-ĕ-a ; na-num (dwarf). A synonym of *T. botryoides.*

T. obscurum—ob-scu′-rum (obscure). Synonymous with *T. rigidum.*

T. olivaceum—ol-i-va′-cĕ-um (olive-green). A variety of *T. pyxidiferum.*

T. parvulum—par′-vul-um (rather small), *Poiret.*

This small-growing species, native of Japan, China, Java, Madagascar, &c., is a remarkably pretty plant, of easy culture either on a fragment of Tree Fern or on a piece of fibrous peat. Its very attractive little fronds, produced from wide-creeping, thread-like, interlaced rhizomes, and borne on very short, slender stalks, are round or nearly so in general outline, wedge-shaped at the base about ½in. each way, and cut like a fan about half-way down from the outer edge in the direction of the base into narrow, irregular

segments (Fig. 105, reduced from Col. Beddome's "Ferns of British India," by the kind permission of the author). They are of a very transparent nature.—*Hooker*, *Species Filicum*, i., p. 118, t. 39A. *Nicholson*, *Dictionary of Gardening*, iv., p. 81. *Beddome*, *Ferns of British India*, t. 179.

T. peltatum—pel-ta′-tum (peltate), *Baker.*

A very curious species, of small dimensions, discovered in Samoa (where it clothes the branches of trees) by the Rev. T. Powell, who states that it is quite peculiar in habit. "The different branches of the caudex," writes the discoverer, "run upwards, but so closely together that the margins of the fronds overlap each other. The fronds all lie flat upon the tree, so that the whole Fern has much the appearance of a delicate foliaceous lichen or frondose Jungermannia."—*Hooker*, *Synopsis Filicum*, p. 73.



Fig. 105. Trichomanes parvulum (⅔ nat. size).

T. Petersii—Pe-ters′-ĭ-i (Peters'), *Asa Gray.*

According to Eaton, this tiny plant is found growing in broad patches in the shade on sand rocks kept constantly moist by the running water near the Sipsey River, in Winston County, Alabama, where it was first discovered by the Hon. Thomas Minott Peters in January, 1853, and in other neighbouring places, but always near running water. Its fronds, produced from a thread-like rhizome, are seldom more than ½in. long and vary in shape from linear to spoon-shaped; they are sometimes entire and sometimes notched or slightly lobed.—*Hooker*, *Icones Plantarum*, t. 986. *Nicholson*, *Dictionary of Gardening*, iv., p. 81. *Hooker*, *Second Century of Ferns*, t. 86. *Eaton*, *Ferns of North America*, t. 24, fig. 2.

T. pinnatifidum—pin-na-tif′-id-um (pinnatifid), *Van den Bosch.*

A species of medium dimensions, native of Jamaica, with fronds 2in. to 4in. long, borne on slender stalks 1in. to 2in. long and winged above. These

fronds are broadly spear-shaped in general outline, and are cut down to within a short distance of the midrib into narrow segments 1in. long, with deep, rounded lobes.—*Hooker*, *Synopsis Filicum*, p. 78.

T. pinnatum—pin-na′-tum (pinnate), *Hedwig.*

This species, native of Tropical America, and as beautiful as it is curious, is also called *T. floribundum.* Its fronds are produced from an upright, tufted rootstock, and borne on strong, naked or slightly hairy stalks 3in. to 12in. long and of a wiry nature; they are simply pinnate (once divided), 4in. to 18in. long, 3in. to 12in. broad, and often proliferous and rooting at their summit, where they terminate in a tail-like process. They are composed of from two to ten pairs of very transparent leaflets and a terminal one, all of them 2in. to 6in. long, about ¾in. broad, sharply and finely toothed, the upper edge being usually free from the stem at the base, while the under-one is attached to it and often furnished with a broad wing. The spore masses are disposed all round the leaflets. This species succeeds best on a mossy piece of Tree Fern and in a temperature higher than that required for most of the Trichomanes.—*Hooker and Greville*, *Icones Filicum*, t. 9. *Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. pluma—plu′-ma (feather-like), *Hooker.*

This beautiful and rare species is a native of Borneo, where it was discovered near Sarawak by T. Lobb, growing amongst decayed logs and moss. Its elegant fronds, 6in. to 9in. long including their wiry stalks, are produced from a thick, short, scarcely creeping rhizome; they are three or four times divided to the rachis, and their segments, which are hair-like and stand out on all sides, form a thickened mass of foliage as delicate as the finest sea-weeds.—*Hooker*, *Icones Plantarum*, t. 997; *Second Century of Ferns*, t. 97. *Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. Prieurii—Prieur′-ĭ-i (Le Prieur's), *Kunze.*

This magnificent species, which in gardens is better known under the name of *T. anceps*, and is also called *T. Leprieurii*, is a native of the West Indies, Peru, and Brazil. It is of erect and somewhat rigid habit. The fronds, produced from an upright rootstock and borne on strong, tufted stalks 4in.

to 8in. long and either naked or only slightly hairy, are 1ft. to 1½ft. long, 6in. to 12in. broad, broadly egg-shaped, and three or four times divided nearly to the midrib. The main rachis (stalk of the leafy portion) is very narrowly winged throughout or above only. The lower leaflets, 4in. to 6in. long, are divided into pinnules (leafits), which are again deeply cleft into rather distant, long, narrow, sharply-toothed segments. The texture of the fronds is somewhat leathery, their colour is dark green, and they are slightly hairy on their upper surface.—*Hooker*, *Species Filicum*, i., p. 135, t. 40G; *Garden Ferns*, t. 11. *Lowe*, *New and Rare Ferns*, t. 65.

T. proliferum—pro-lif′-er-um (proliferous), *Blume*.

A pretty, slender-growing species, usually easily recognisable by its peculiar proliferous, branching habit, though the fronds are very variable in outline. The fronds are produced from a wide-creeping, densely-interlaced rhizome, and are borne on slender stalks 1in. to 3in. long, each stalk supporting one to three deeply-divided fronds, with narrow segments repeatedly branched and divided nearly to the central rachis.—*Hooker*, *Species Filicum*, i., p. 118, t. 39B. *Beddome*, *Ferns of Southern India*, t. 262.

T. pyxidiferum—pyx-id-if′-er-um (box-bearing), *Linnæus*.

A very variable species, native of the West Indies, Brazil, and Peru, where it grows on trunks of Palms and other trees. It is a plant with wide-creeping, rather slender rhizomes of a woolly nature, and narrow-oblong fronds 1in. to 6in. long and 1in. to 1½in. broad, borne on naked stalks 1in. to 2in. long and winged above. The leaflets are divided nearly to the midrib, and the leafits are again deeply cleft into narrow, transparent segments. *T. Vieillardi* is synonymous with this species.—*Hooker and Greville*, *Icones Filicum*, t. 206. *Nicholson*, *Dictionary of Gardening*, iv., p. 81. *Lowe*, *New and Rare Ferns*, p. 161.

T. p. olivaceum—ol-i-va′-cĕ-um (olive-green), *Kunze*.

In this variety the segments are broader and less divided than in the type, and the wing of the rachis is somewhat crisped. Like the original species, *T. p. olivaceum* thrives best on a piece of hard wood, and requires the close, humid atmosphere of the warm house.—*Hooker*, *Synopsis Filicum*, p. 81.

T. radicans—ra-di′-cans (rooting), *Swartz.*

This species, extensively known under the popular name of "Killarney Fern," and also called *T. brevisetum*, is of a very cosmopolitan character. It is the only representative of the genus found in Europe, and is undoubtedly the most beautiful of all the Filmy Ferns. It is first mentioned as a British Fern by Dillenius in the third edition of Ray's "Synopsis," published in 1724. He states that it was found by Mr. Richardson, at the head of Elm Crag Well, at Bellbank, near Bingley, Yorkshire, in which locality it was also found in 1758 by Bolton, who then remarked that it was plentiful in that district—now, unfortunately, only remembered as a habitat of days gone by. The copper plates given by Dillenius establish the identity of the plant beyond any doubt, even if his description were not sufficient for the purpose. He describes it as "*Filix humilis repens, foliis pellucidis et splendentibus, caule alato*" (Dwarf creeping Fern, with transparent and shining leaves, and with winged stems). The above-named place is the only spot in England where the finding of the Killarney Fern has been recorded. According to Lowe ("Our Native Ferns," vol. ii., p. 448), it has been found growing luxuriantly in some abundance in various places, extending over several miles in Wales, and the naming of *T. radicans cambricum* confirms the statement, but the localities have been kept secret on account of the dread of its extermination by collectors, this beautiful Fern being much sought after, as may be gathered from the statement that although Bolton found it in abundance near Bingley in 1758, he could only find one root in the same locality in 1782. In Ireland it is commoner, for, besides such well-known localities as the Powerscourt Waterfall and the waterfall above Turk Cottage, Killarney, where it has been found exposed to the spray on shady banks and rocks, this Bristle Fern is also reported from various stations in the counties of Cork, Kerry, Waterford, Wicklow, &c.; but we cannot find any record of its existence in Scotland.

The cosmopolitan character of the Killarney Fern is shown in its geographical distribution, as may be seen by the following notes extracted from Lowe's excellent work, "Ferns British and Exotic" (vol. viii., p. 43): "It was observed by Swartz, Bancroft, and Purdie in the woods in Jamaica. In Brazil, according to Raddi, Forbes, Macrae, Scouler, Gardner, Sinclair, and Vautier, the variety *Andrewsii* appears to occur, bearing fronds from 6in. to

18in. in length; according to Colonel Hall, a similar form exists in the forest of Esmeraldas, El Equador. In the Azores, Dr. Hochstetter and Mr. H. C. Watson discovered it at an elevation of from 2000ft. to 3000ft. above the level of the sea. It is also a native of Spain, Teneriffe, the Canary Isles, Madeira, Mexico, New Granada, Venezuela, Brazil, the Sandwich Islands; and Beddome, in his 'Ferns of British India,' gives an illustration (t. 181) of the plant as found on the Khasya Hills." Eaton also states, in his "Ferns of North America," that it is found in Alabama, and gives an illustration of it.

The fronds of *T. radicans* (see Coloured Plate) are produced from a wide-creeping rhizome of a hairy nature, which has a great predilection for stone, clinging thereto with great tenacity. They are borne on stalks 2in. to 6in. long, naked or nearly so, and sometimes winged in their upper part. The leafy portion of the frond varies from 4in. to 12in. in length and 2in. to 6in. in breadth; it is three times deeply cleft nearly to the rachis, which is very narrowly winged. The leafits are again deeply cleft into deeply-toothed segments, and their texture, though transparent, is particularly firm.—*Hooker, British Ferns*, t. 42. *Nicholson, Dictionary of Gardening*, iv., p. 81. *Lowe, Our Native Ferns*, ii., t. 71; *Ferns British and Exotic*, viii., t. 9A. *Beddome, Ferns of British India*, t. 181. *Moore, Nature-printed British Ferns*, t. 48.

T. radicans is a very variable species, and some of its numerous forms are very beautiful. The following are among the most distinct:

T. r. alabamense—al-ab-a-men′-sĕ (native of Alabama).

For this name, under which a remarkably pretty form is grown in this country, we cannot find any authority. But Eaton, in his "Ferns of North America" (p. 180), gives a description of the plant, which he also illustrates (t. 24, fig. 1), under the name of *T. radicans*, or "Alabama Bristle Fern," and which corresponds exactly with the plant known in gardens as *T. alabamense*. He adds that it grows on shaded or overhanging sandstone cliffs constantly moistened by spray, and that it was first discovered by the Hon. T. M. Peters, in July, 1852, in Winston County, Alabama, and eventually in many places in North America.

For the history as well as for the description of his *T. radicans*, Eaton refers to Williamson, who, in his "Ferns of Kentucky" (p. 123), states: "I discovered it growing in more than a dozen localities under the Green

River Country Cliffs. It was found in every instance on the under-side of an overhanging rock, generally considerably withdrawn from the light, never reached by the direct rays of the sun. It does best on a moist rock, where it is bedewed by spray from falling water or where the clear, trickling water keeps the fronds constantly moist. Each frond of this Fern has an interesting history; from first to last they live many years. The whole under-surface of the rock is one matted mass of roots and stems, covered with innumerable translucent fronds in all stages of growth and maturity. The young frond gradually expands and slowly attains full size. In two or three years perhaps the fruit begins to develop on the edges of the fronds, at the tips of the veins. This fruit is clustered in a cup around a fine hair which comes from its centre. The hair, or bristle, continues to grow in length, and the fruit to develop at its base around it. As the bristle grows in length—sometimes it is found 1in. long—the ripe fruit is shed, so that there remains about the same quantity of fruit always at the base of the hair. The whole life of the frond may be half-a-dozen years." The dimensions of the fronds, given as from 3in. to 7in. long and less, sometimes much less, than 2in. broad, as well as their being produced from a creeping rhizome 1ft. long, but less than a line thick, and their being borne on short stalks winged from the very base to the top of the fronds, unmistakably point out that this is the *T. alabamense* of gardens.



Fig. 106. Portion of Frond of Trichomanes radicans Andrewsii (½ nat. size).

T. r. Andrewsii—An-drew′-sĭ-i (Andrews'), *Newman.*

This variety, found in 1842 at Iveragh, Ireland, by Mr. Wm. Andrews, of Dublin, is very distinct. It differs from the species in having narrower, more spear-shaped fronds, in their leaflets being more distant and distinct (Fig. 106), in the stalk being more elongated and less winged, and in the involucre being quite sunk in the margin of the frond.—*Lowe, Our Native Ferns*, ii., fig. 859; *Ferns British and Exotic*, viii., p. 43. *Moore, Nature-printed British Ferns*, t. 48c.

T. r. cambricum—cam′-bri-cum (Welsh).

For the name of this variety we cannot find any authority. It differs from the species in the leafy portion of its handsome fronds being broadly triangular and in their leafits being quite wedge-shaped at the base and also much more numerous.

T. r. concinnum—con-cin′-num (neat), *Moore.*

A very pretty form, with egg-shaped fronds borne on short, scarcely-winged stalks, and leaflets closely set. The pinnules (leafits) are somewhat more elongated and narrower than those of the species.

T. r. dilatatum—di-la-ta′-tum (enlarged), *Backhouse.*

This differs from the species, and indeed from all other known varieties, by its large, very dark green fronds, and by its leafits, which are much less divided than in the type and broadly winged.—*Lowe*, *Our Native Ferns*, ii., p. 450. *Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. r. dissectum—dis-sec′-tum (cut), *Moore.*

A variety somewhat similar in size and form of frond to *T. r. cambricum*, but with leafits cut again into narrow segments; sometimes these segments are wedge-shaped at the base, when the plant is called *T. r. d. cuneatum*, for which name we cannot find any authority.

T. r. Kunzeanum—Kunz-ĕ-a′-num (Kunze's), *Hooker.*

The fronds of this variety, native of Brazil, are 1ft. to 1½ft. long, of a somewhat leathery texture, with the stalk and rachis scarcely, if at all, winged; the leaflets are distant, stalked, the leafits deeply cleft, and their lowest lobes again cut into very long and narrow segments.—*Hooker*, *Species Filicum*, i., p. 127, t. 39D.

T. r. Luschnatianum—Lusch-nat-ĭ-a′-num (Luschnat's), *Presl.*

This beautiful variety, also a native of Brazil, is readily distinguished from all others through its fronds being quite stalkless, the leaflets reaching to near the rhizome, and the leafy portion being spear-shaped and tapering to a narrow point.—*Hooker*, *Synopsis Filicum*, p. 81. *Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. r. proliferum—pro-lif′-er-um (proliferous), *Druery*.

A very curious form, found wild in Ireland. The fronds, when fully developed and matured, are dotted over with small bulbils, from which young plants are easily raised.—*Druery, Choice British Ferns*, p. 148.

T. reniforme—re-nif-or′-mĕ (kidney-shaped), *Forster*.

This, the "Kidney Fern of New Zealand," is a plant of very peculiar habit (see Coloured Plate), provided with naked rhizomes of a particularly wiry nature. Its fronds, kidney-shaped and entire, with a deep notch at the base, are 2in. to 4in. broad and very transparent, though somewhat thick; they are borne on naked, wiry stalks 4in. to 8in. long, and, when fertile, the spore masses are arranged in a very regular manner all around their outer edge, and disposed at the end of almost every vein. This plant succeeds best on soft sandstone broken into small pieces and mixed with rough, fibrous peat.—*Hooker and Greville, Icones Filicum*, t. 31. *Hooker, Species Filicum*, i., p. 115; *Exotic Ferns*, t. 2. *Nicholson, Dictionary of Gardening*, iv., p. 81. *Lowe, Ferns British and Exotic*, viii., t. 9A.

T. rigidum—rig′-id-um (rigid), *Swartz*.

A very striking and distinct species, native of Brazil, Peru, the West Indies, the Philippine Islands, and Ceylon. The fronds, which are broadly egg-shaped, 2in. to 8in. long, and 2in. to 6in. broad, are borne on tufted, erect, wiry stalks 2in. to 8in. long and naked or very slightly winged above; they are three or four times divided nearly to the midrib, and their lower leaflets, 2in. to 3in. long, are divided into leafits which are again deeply cleft into narrow, toothed, very dark green lobes of a somewhat leathery texture. This species is also known as *T. achilleæfolium*, *T. obscurum*, and *T. Seemanni*.—*Hooker, Species Filicum*, i., p. 133.

T. r. elongatum—e-long-a′-tum (lengthened), *Cunningham*.

This variety differs from the typical plant in having deltoid fronds; their leaflets and leafits, often overlapping, have broader segments and often terminate in a tail-like process.—*Hooker, Icones Plantarum*, t. 701.

T. rufum—ru′-fum (reddish), *Baker*.

This pretty species, of medium dimensions, native of Demerara, is very distinct. Its simply-pinnate fronds, 10in. long and 1½in. broad, are pale green

above, and, like their short stalks, most profusely clothed underneath with long, reddish, woolly hairs. The very transparent leaflets overlap each other. —*Nicholson*, *Dictionary of Gardening*, iv., p. 81.

T. scandens—scan′-dens (climbing), *Linnæus.*

A lovely, delicate species, native of Jamaica and Mexico, where it is found growing on trees. Its wide-creeping rhizome is of a wiry nature, and its fronds, 6in. to 18in. long and 3in. to 6in. broad, are borne on strong, erect, naked stalks 2in. to 4in. long. These fronds are cut quite to the stalk, which sometimes is slightly winged and hairy; their pinnules (leafits) are divided down to a narrow wing into segments that are again pinnatifid about half-way down, with the margins finely hairy. — *Hooker*, *Species Filicum*, i., p. 140. *Nicholson*, *Dictionary of Gardening*, iv., p. 82. *Lowe*, *New and Rare Ferns*, t. 62A.

T. Seemanni—See-man′-ni (Seemann's). Synonymous with *T. rigidum.*

T. Sellowianum—Sel-lo-wĭ-a′-num (Sellow's), *Hooker.*

A very pretty species, native of Brazil, with narrow-spear-shaped fronds of a bright green colour, borne on stalks densely clothed with short hairs; their oblong, blunt segments are waved at the edges, where there are a few short hairs.—*Nicholson*, *Dictionary of Gardening*, iv., p. 82.

T. setigerum—se-tig′-er-um (bristly), *Hooker.*

A species of medium dimensions, native of Borneo. Its tufted, narrow or narrow-spear-shaped, simply-pinnate fronds are borne on perfectly cylindrical stalks 2in. to 9in. long and furnished with hair-like scales. The leaflets are again deeply divided into hand-shaped leafits with elongated and very narrow ultimate segments.—*Nicholson*, *Dictionary of Gardening*, iv., p. 82.

T. sinuosum—sin-ŭ-o′-sum (wavy), *Richard.*

This species, native of Tropical America and the West Indies, is provided with a somewhat strong, wide-creeping, wavy rhizome, from which the narrow-spear-shaped fronds, borne on stalks scarcely 2in. long, are produced. The leaflets are cut down to a broadly-winged rachis; they are of a bright green

colour and their texture is delicately membranous. *T. incisum* is another name for this species.—*Hooker and Greville*, *Icones Filicum*, t. 13. *Lowe*, *Ferns British and Exotic*, viii., t. 10G. *Nicholson*, *Dictionary of Gardening*, iv., p. 82.

T. Smithii—Smith′-ĭ-i (Smith's), *Hooker*.

This elegant, drooping species, native of the Philippine Islands, somewhat resembles the better-known *T. tenerum*. Its delicate-looking, oblong-spear-shaped fronds, 4in. to 8in. long and 1in. to 1½in. broad, are borne on slender, naked stalks 1in. to 2in. long; they are of a flaccid nature and are divided three times nearly to the midrib, which is only slightly winged towards the summit. The leaflets have their divisions usually simple, occasionally forked, long, narrow, and very transparent.—*Hooker*, *Species Filicum*, i., p. 138; *Icones Plantarum*, t. 704.

T. (Feea) spicatum—Fe′-ĕ-a; spi-ca′-tum (spiked), *Hedwig*.

This thoroughly distinct species, of medium dimensions, is a native of the West Indies, Panama, Guiana, and Ecuador. Its barren and fertile fronds, which are produced from a tufted rootstock, are dissimilar. The barren ones, spear-shaped and shorter than the others, are borne on stalks 1in. to 2in. long, and their leafy portion, deeply cleft nearly to the midrib, usually measures 4in. to 6in. in length and 1½in. in breadth; their segments are almost horizontal, oblong, and notched on the margins. The fertile fronds, narrow and erect, are composed of a rachis and two rows of spore masses, without any connecting membrane. This species thrives best on wood; it requires a higher temperature (65deg. to 75deg.) than most of the Trichomanes, and a very humid but airy atmosphere.—*Hooker*, *Species Filicum*, i., p. 114; *Garden Ferns*, t. 60. *Nicholson*, *Dictionary of Gardening*, iv., p. 82. *Lowe*, *New and Rare Ferns*, t. 67C.

T. Sprucei—Spru′-cĕ-i (Spruce's), *Baker*.

A species much resembling the better-known *T. gemmatum*, but its fronds, 3in. to 4in. long, 1½in. to 2in. broad, and of a very transparent nature, have a broadly-triangular outline; they are also more deeply divided, and their segments are distinctly flattened.—*Hooker*, *Synopsis Filicum*, p. 87.

T. strictum—stric′-tum (straight), *Menzies.*

This species, native of New Zealand, has spear-shaped fronds 4in. to 6in. long, three or four times divided nearly to the stalk, which is narrowly winged. The crowded and spear-shaped leaflets have their lower leafits deeply cleft into strap-shaped lobes, the whole being of a very pale green colour.—*Hooker, Species Filicum*, i., p. 136.

T. superbum—sup-erb′-um (superb), *Van den Bosch.*

This beautiful species, which requires a higher temperature than most of the Trichomanes, is of very distinct habit. Its broadly-egg-shaped fronds, 4in. to 9in. long and 2in. to 4in. broad, are produced from a strong, wide-creeping rhizome, and their strong stalks are 2in. to 5in. long and winged nearly down to the base. The lower leaflets are divided more than half-way to the stalk into oblong, toothed lobes. This plant, which is a native of Trinidad and British Guiana, is also found in gardens under the name of *T. fimbriatum.—Hooker, Synopsis Filicum*, p. 78. *Nicholson, Dictionary of Gardening*, iv., p. 82.

T. tenerum—ten′-er-um (slender), *Sprengel.*

A pretty little species, of particularly slender habit, native of Tropical America. Its creeping rhizomes are very slender, though woolly. The spear-shaped, flaccid, pendulous fronds, 3in. to 8in. long and 1½in. broad, are three times cut nearly to the rachis. The distant, flaccid leaflets are cut again into deeply-cleft, pale green leafits and segments of a very transparent nature. *T. angustatum* is a garden name for this species.—*Hooker and Greville, Icones Filicum*, t. 166. *Nicholson, Dictionary of Gardening*, iv., p. 82. *Lowe, New and Rare Ferns*, t. 67A.

T. trichoideum—trich-ŏ-i′-dĕ-um (hair-like), *Swartz.*

This most lovely, delicate-looking, thread-like Fern—undoubtedly the most finely-divided of all kinds known in cultivation—is a native of Ecuador, Brazil, and the West Indies, where it grows on trunks of trees. It is of upright habit, with slender, creeping rhizomes, from which its spear-shaped fronds, 4in. to 8in. long and 1in. to 2in. broad, are produced in abundance. These fronds are borne on very slender, naked stalks 1in. to 2in. long, and

are three times divided nearly to the rachis, which is only very slightly winged at the extremity. The leafits are again divided into hair-like segments, which are of a membranous texture and have a central vein only.—*Hooker and Greville*, *Icones Filicum*, t. 199. *Nicholson*, *Dictionary of Gardening*, iv., p. 82. *Lowe*, *New and Rare Ferns*, t. 67B.

T. trichophyllum—trich-oph-yl′-lum (having hair-like fronds), *Moore.*

This is a very finely-divided species, native of Borneo and New Caledonia. Its oblong fronds, 2in. to 4in. long and 1in. to 1½in. broad, are borne on cylindrical stalks of a wiry nature, 1in. to 2in. long, and produced from a densely-tufted rootstock. The rachis (stalk of the leafy portion) is stiff and cylindrical throughout. The leaflets much overlap each other, and their leafits are copiously cleft into bristle-like segments ⅛in. to ¼in. long and spreading in all directions. The abundant spore masses are placed near the base of the pinnules (leafits) on the upper side. *T. Morierii* is another name for this species.—*Moore*, *Gardeners' Chronicle*, 1862, p. 45. *Nicholson*, *Dictionary of Gardening*, iv., p. 82.

T. venosum—ve-no′-sum (veined), *R. Brown.*

A distinct and pretty species, of small dimensions, native of Australia, Tasmania, and New Zealand, where it is invariably found growing on trunks of trees and frequently of Tree Ferns, which are densely clothed with it. The thread-like rhizome may attach itself to a piece of stone, but it much prefers rambling among the roots of a Tree Fern. The fronds, of a grass-green colour and very transparent, are seldom more than 3in. long under cultivation, although in their native habitats they reach nearly twice that size; they are distinctly pinnate, with distant leaflets, which are sometimes pinnatifid, although usually simple, narrow, and toothed.—*Hooker and Greville*, *Icones Filicum*, t. 78. *Nicholson*, *Dictionary of Gardening*, iv., p. 82. *Lowe*, *Ferns British and Exotic*, viii., t. 9B.

T. Vieillardi—Vieil-lard′-i (Vieillard's). Synonymous with *T. pyxidiferum.*

The Trichomanes above described represent only a portion of the species at present known in culture and in herbaria, for in the second edition of Hooker and Baker's "Synopsis Filicum" (published in 1873) no less than

one hundred species are fully described. Among the foregoing, however, may be found all those that are possessed of any particularly decorative qualities. A certain number of plants of very small dimensions (not exceeding 1in. in height), although not really ornamental, are sufficiently distinct and interesting from a botanical point of view to be here mentioned. A full description of each of the species enumerated in this list is given in Hooker and Baker's "Synopsis Filicum."

T. alternans, Carruthers.
T. apodum, Hooker and Greville.
T. Armstrongii, Baker.
T. concinnum, Mettenius.
T. cuspidatum (*Bojeri*), Willdenow.
T. denticulatum, Baker.
T. exiguum, Baker.
T. flabellatum, Bory.
T. latemarginale, Eaton.
T. lineolatum, Hooker.
T. Lyallii, Hooker.
T. Mannii, Baker.
T. melanopus, Baker.
T. Motleyi, Van den Bosch.
T. pinnatinervum, Baker.
T. Powellii, Baker.
T. punctatum, Poiret.
T. pusillum (*quercifolium*), Swartz.
T. reptans, Swartz.
T. saxatile, Hooker.
T. saxifragoides, Presl.
T. viridens, Mettenius.
T. vitiense, Baker.

CHAPTER XX.

TROCHOPTERIS, *Gardner.*

(Troch-op′-ter-is.)

Wheel Fern.

ONLY one species of this genus is at present known in herbaria, and, so far as we are aware, it is not in cultivation. *Trochopteris* is a division of the sub-order *Schizœaceæ*, and forms in Hooker and Baker's "Synopsis Filicum" Genus 67. The name is derived from *trochos*, a wheel, and *pteris*, a Fern, in allusion to the appearance of the plant, the fronds of which resemble the leaves of a *Geum*, and are disposed in a dense, rosulate tuft. The distinctive characters of the genus reside in the habit of the plant, which resembles a dwarf *Anemia*, but with fertile and barren parts of the fronds not distinct, and in the disposition of the fructification, the capsules being small, stalkless, and placed irregularly round the edge of the under-side of the slightly-contracted lower lobes of the leafy fronds. The plant not being grown in Europe, we cannot give any information respecting its culture.

T. elegans—e′-leg-ans (elegant), *Gardner.*

A stove species, native of South Brazil and Cuba. Its fronds, 1in. long and little more than ½in. broad, are borne on very short stalks; they are lyrate-pinnatifid (having several pairs of small lobes with deep depressions between them), of a soft, papery texture, and hairy on both surfaces. The upper lobes are rounded and not deep, and the lowest pair reach down nearly to the midrib and have laciniated edges.—*Hooker, Synopsis Filicum*, p. 436.

CHAPTER XXI.

VITTARIA, *Smith.*

(Vit-ta′-rĭ-a.)

Ribbon Ferns.

THIS small genus, almost entirely composed of tropical plants with free veins and grass-like fronds of a somewhat leathery texture, derives its name from *vitta*, a ribbon, in allusion to the narrow fronds of all the species which are comprised in it. In Hooker and Baker's "Synopsis Filicum" it forms Genus 56, and represents a sub-division of the tribe *Grammitideæ*. Although very interesting in themselves, Vittarias are not of much decorative value; they are very difficult of discrimination, and, although Fée (who has published an elaborate, illustrated monograph of the genus in which he relies to a large extent upon microscopic characters—the shape of the spores and abortive capsules) describes a great number, we have considered it advisable to follow Hooker and Baker, who admit only about a dozen species. These, according to the disposition of the spores, are divided into two sections as follow:

Euvittaria (Eu-vit-ta′-rĭ-a), or true *Vittaria*. In this division are embraced plants with spore masses sunk in a distinctly two-lipped marginal groove.

Tæniopsis (Tæn-ĭ-op′-sis), *J. Smith*. The plants of this section, which is by far the larger of the two, have their spore masses disposed in a line that is slightly intramarginal (situated about ¼in. from the margin), with the unaltered edge of the frond produced beyond and often rolled over it.

Culture.

Vittarias succeed well in sandy peat and under the influence of a moist, stove temperature. Their propagation is usually effected by division of the crowns.

Principal Species.

V. (Euvittaria) elongata — Eu-vit-ta′-rĭ-a ; e-long-a′-ta (lengthened), *Swartz.*

This species, also known in gardens under the names *V. ensiformis*, *V. zosterælolia*, and others, is found in the Himalayas, New South Wales, Ceylon, the Mascarene Islands, and the Seychelles, and on the Guinea Coast. Its fronds, 6in. to 18in. long, but seldom more than ¼in. broad, are either sharp-pointed or bluntish at their summit, their lower part being narrowed very gradually to the base ; they are of a somewhat leathery texture, with the midrib faint or distinct. The spore masses are quite sunk in a marginal groove, with two nearly equal lips, which open outwards.—*Hooker*, *Synopsis Filicum*, p. 395. *Nicholson*, *Dictionary of Gardening*, iv., p. 188. *Lowe*, *Ferns British and Exotic*, ii., t. 65B. *Beddome*, *Ferns of Southern India*, t. 21.

V. ensiformis—en-sif-or′-mis (sword-shaped). Synonymous with *V. elongata.*

V. (Tæniopsis) falcata—Tæn-ĭ-op′-sis ; fal-ca′-ta (sickle-shaped), *Kunze.*

In this species, native of Malaysia, the fronds, 4in. to 5in. long and ⅛in. broad, are blunt at their summit and their lower part is gradually narrowed to the base ; they are of a leathery and very thick texture, with a distinct, raised midrib extending to the summit in the barren fronds, but lost in the fertile ones.—*Hooker*, *Species Filicum*, v., p. 182.

V. filifolia—fi-lif-ol′-ĭ-a (having thread-like leaves). A synonym of *V. lineata.*

V. (Tæniopsis) Gardneriana—Tæn-ĭ-op′-sis ; Gard-ner-ĭ-a′-na (Gardner's), *Fée.*

A species native of the Organ Mountains, Brazil, with fronds 1ft. or more in length, ¼in. broad, sharp-pointed at their summit, gradually narrowed at the base to a short, slender stem ; they are of a very thin texture and show a slender, immersed midrib extending from the base to the summit. The spore

masses are disposed in a broad, superficial, slightly intramarginal line, with the edge produced beyond but not wrapped over it.—*Hooker*, *Species Filicum*, v., p. 178.

V. (Tæniopsis) lineata—Tæn-ĭ-op′-sis ; li-nĕ-a′-ta (lined), *Swartz.*

The fronds of this curious species, which is found in Japan, the West Indies, Peru, the Mascarene Islands, and Cape Colony, on the Himalayas, &c., are so very narrow that they have more the appearance of leafless stems than of fronds. They are 6in. to 18in. long, but barely $\frac{1}{8}$in. broad, gradually narrowed downwards to a stout, compressed stem, which gradually passes into the frond, the edge often being reflexed ; they are of a firm texture and have a distinct, raised midrib running from their base to their summit. *V. filifolia* is identical with this species.—*Hooker*, *Species Filicum*, p. 180. *Nicholson*, *Dictionary of Gardening*, iv., p. 188. *Lowe*, *Ferns British and Exotic*, ii., t. 65A.

V. (Tæniopsis) remota—Tæn-ĭ-op′-sis ; rem-o′-ta (distant), *Fée.*

In this species, native of the West Indies and Ecuador, the fronds, 1ft. to 2ft. long, $\frac{1}{2}$in. broad, and of a moderately firm texture, are gradually narrowed to the base or a short, compressed stem ; their dark-coloured midrib, distinct below, is often lost before it reaches the summit. The spore masses are disposed in a broad, superficial, distinctly intramarginal line, the edge of which is not at all wrapped over it.—*Hooker*, *Species Filicum*, p. 185.

V. (Tæniopsis) scabrida—Tæn-ĭ-op′-sis ; scab′-rid-a (rough), *Klotzsch.*

A small-growing species, of little decorative value, native of Mexico and Brazil. Its spore masses are sunk in an intramarginal groove, with the flattened, thick edge of the frond produced beyond it.—*Hooker*, *Species Filicum*, v., p. 182.

V. (Tæniopsis) scolopendrina — Tæn-ĭ-op′-sis ; scol-op-en-dri′-na (centipede-like), *Thwaites.*

This is the largest and most decorative of all the Vittarias at present known. Its fronds, 1ft. to 1$\frac{1}{2}$ft. long and $\frac{3}{4}$in. broad, are sharp-pointed at the summit, very gradually narrowed to the base, have their edge entire, and are of a thick texture ; their thick, blackish midrib, grooved in front

below, is sometimes nearly lost upwards. The spore masses are disposed in broad, continuous, sub-marginal lines, with the firm, unaltered edge of the frond at first wrapped over them. This plant is a native of New Guinea, Malaysia, the Neilgherries, Ceylon, the Seychelles, &c.—*Hooker*, *Species Filicum*, v., p. 117. *Nicholson*, *Dictionary of Gardening*, iv., p. 188.

V. (Tæniopsis) stipitata—Tæn-ĭ-op′-sis ; sti-pit-a′-ta (stalked), *Kunze.*

The habitat of this species extends from Columbia to Peru. Its fronds, 1½ft. to 2ft. long and scarcely ¼in. broad, gradually taper below into a long, slender stem ; they are of firm texture, with an indistinct midrib except towards the base. The spore masses are sunk in a groove within the margin, with the flattened, thickened edge of the frond produced beyond it.—*Hooker*, *Species Filicum*, p. 179.

V. (Tæniopsis) stricta—Tæn-ĭ-op′-sis ; stric′-ta (upright), *Carmichael.*

A species from Tristan d'Acunha, with thick fronds 1½ft. long, ⅛in. broad, and narrowed below to a compressed stem ; a stout midrib extends to their summit, the spore masses occupying the whole space between it and the much-reflexed edge.—*Hooker*, *Species Filicum*, v., p. 182.

V. (Tæniopsis) sulcata—Tæn-ĭ-op′-sis ; sul-ca′-ta (furrowed), *Kuhn.*

This species, native of Ceylon and the Society Islands, produces from a short-creeping rhizome its strap-shaped, stalkless, blunt fronds, which are narrowed to the base, 2in. to 4in. long, and ⅛in. broad. The midrib is visible only in the barren lower half of the fronds. The spore masses are disposed in a deep, intramarginal furrow confined to the very much thickened upper half of the frond, where the midrib and veins are quite lost.—*Hooker*, *Synopsis Filicum*, p. 518.

V. zosteræfolia — zo-ste-ræ-fol′-ĭ-a (Zostera-fronded). Synonymous with *V. elongata.*

In addition to the species above described, we may mention *V.* (*Tæniopsis*) *debilis* of Kuhn, and *V.* (*T.*) *pumila* of Mettenius, both diminutive plants of botanical interest only.

CHAPTER XXII.

WOODSIA, *R. Brown.*

(Wood′-sĭ-a.)



N Hooker and Baker's "Synopsis Filicum" *Woodsia* forms Genus 11. It is dedicated to the memory of Joseph Woods, author of "The Tourists' Flora," and is composed of about fourteen species of small-growing, much-tufted, greenhouse and hardy Ferns, of distinct appearance and very neat habit. All are of soft texture and of a deciduous nature; their stalks are often jointed and separating at the joints. The distinctive characters of *Woodsia* reside principally in the globose shape of the spore masses and in the inferior, soft, membranous involucre, from the first calyciform or more or less globose and sometimes enclosing the sorus (spore mass), at length opening at the top, its margin or mouth being irregularly lobed or fringed. According to the nature of the involucre the genus *Woodsia* is divided as follows:

Euwoodsia (Eu-wood′-sĭ-a), or *Woodsia* proper, with involucre smaller than the sorus, but fringed with hairs, which extend beyond it; and

Physematium (Phy-se-mat′-ĭ-um), in which the involucre is larger than the sorus and not ciliated.

Culture.

Most of the known Woodsias are found in cold and temperate climates. North America is particularly rich in them, and the genus is well represented in Great Britain by two species, *W. hyperborea* and *W. ilvensis*, both of

which are of particularly distinct character, and rank among the rarest of our native Ferns. As a rule, Woodsias may be said to flourish where but little soil is allowed around their roots, in crevices of damp rocks, or upon the rocks themselves, generally in fairly exposed situations. They are well adapted for growing in small intermediate and hardy Ferneries, where they form suitable companions to *Asplenium Ruta-muraria*, *A. Ceterach* (or *Ceterach officinarum* as it is more commonly called), *A. Trichomanes*, &c., and they may also be successfully cultivated in pots. They require a very open soil, composed of turfy peat and light loam in equal parts, with a free admixture of finely-broken charcoal, sandstone, or silver sand. Thorough drainage is essential, and the crowns of the plants should be kept above the soil and surrounded by a few small stones : the effect of this arrangement is to keep the roots in a permanently moist state without using much water, as they are particularly averse to stagnant moisture.

Woodsias are usually increased by the division of their crowns, an operation which is attended with most satisfactory results when performed during their resting period—from November to March. They may also be propagated by means of their spores, which are produced in abundance and germinate freely, especially when sown in a temperature of 65deg. to 70deg.

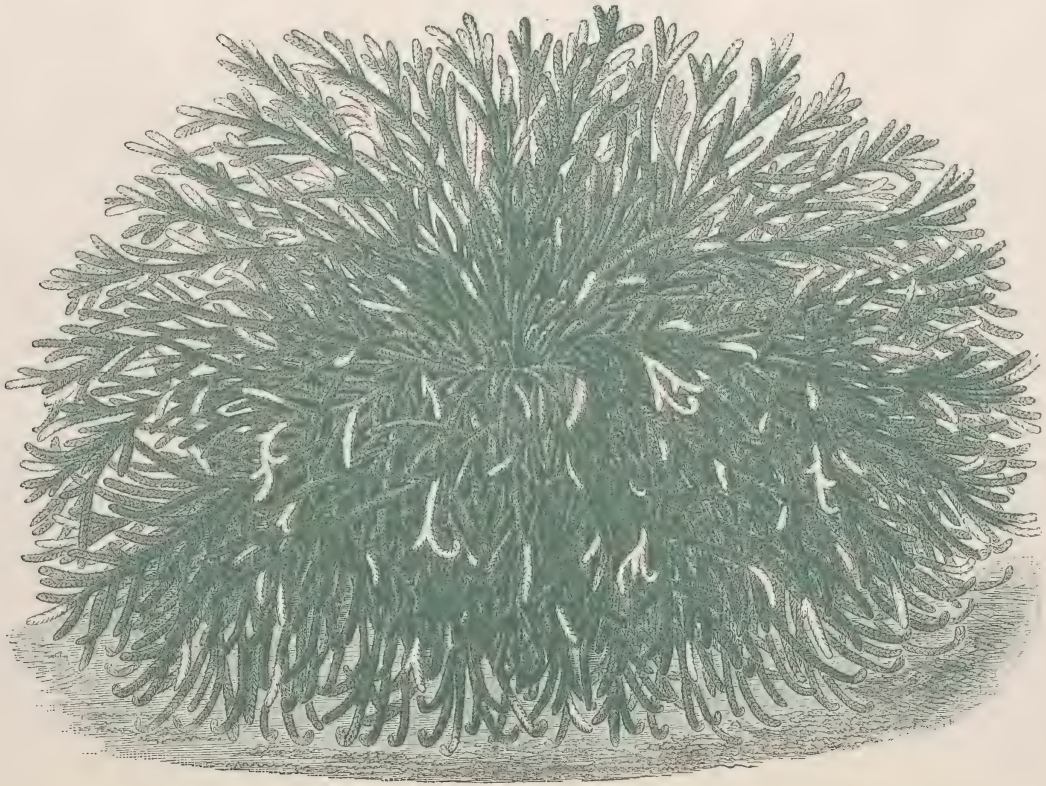
Principal Species and Varieties.

W. alpina—al-pi′-na (alpine). A common garden name for *W. hyperborea*.

W. Brownii—Brown′-ĭ-i (Brown's). Synonymous with *Hypoderris Brownii*.

W. (Physematium) Burgessiana—Phy-se-mat′-ĭ-um ; Bur-ges-sĭ-a′-na (Burgess's), *Gerrard*.

A species found along the Tugela River, Natal. It has spear-shaped fronds 6in. long, 2in. broad, of a soft, hairy nature, and pinnate, their stalkless leaflets being oblong and deeply cleft into broad lobes that are toothed at the summit. The small and sparsely-produced spore masses are covered by a thin, parchment-like involucre opening at the summit, at length breaking down into a very irregular margin. — *Hooker*, *Synopsis Filicum*, p. 46.



Selaginella involvens variegata

(⅔ nat. size).

W. (Physematium) caucasica — Phy-se-mat′-ĭ-um ; cau-cas′-ic-a (Caucasian), *J. Smith.*

This species, better known in gardens under the name of *W. fragilis*, is a native of the Caucasus, where it is found in rocky places, at elevations varying between 1000ft. and 6000ft. Its spear-shaped fronds, about 8in. long, are twice divided to the midrib ; their stalkless leaflets, spear-shaped or broadest at the base, are nearly opposite and again pinnate, the lobes or leafits being oblong, sharp-pointed, and toothed on their margins. The comparatively large spore masses are disposed two on each lobe or leafit and are situated one on each side near the margin.—*Hooker*, *Species Filicum*, i., p. 62. *Nicholson*, *Dictionary of Gardening*, iv., p. 216.

W. (Physematium) elongata — Phy-se-mat′-ĭ-um ; e-long-a′-ta (lengthened), *Hooker.*

A native of North-west India, where it occurs at 10,000ft. elevation. Its oblong fronds, 8in. to 12in. long, are pinnate ; their oblong, blunt leaflets are rather distant, stalkless, and cut more than half-way down into short, rounded, somewhat toothed lobes, each bearing one spore mass on the lower anterior veinlet.—*Hooker*, *Species Filicum*, i., p. 62, t. 21c. *Beddome*, *Ferns of British India*, t. 14.

W. fragilis—frag′-il-is (fragile). A name used in gardens for *W. caucasica* and *W. mollis.*

W. glabella—glab-el′-la (nearly smooth), *Brown.*

This pretty little, delicate-looking Fern, which, Baker says, may possibly be a glabrous form of *W. hyperborea*, is essentially a North American plant. Eaton, in his excellent work, "Ferns of North America," says that it grows on moist, mossy cliffs in the northern parts of New Hampshire, Vermont, and New York, and from the Saguenay River and Montmorency Falls to the Arctic Circle. It also occurs in Alpine and Arctic Europe, Siberia, Kamtschatka, and on the islands near Behring's Strait. In habit it is much like *Asplenium viride*, with narrow fronds tapering a little below, pinnate, and perfectly smooth. These fronds, 1in. to 4in. long, ¼in. broad, and produced from an ascending rootstock, have their leaflets set far apart, all broadly triangular, very blunt, and cut into a few short, rounded or somewhat

wedge-shaped, entire lobes.—*Hooker*, *Species Filicum*, i., p. 64. *Nicholson*, *Dictionary of Gardening*, iv., p. 216. *Eaton*, *Ferns of North America*, ii., t. 60. *Correvon*, *Les Fougères rustiques*, p. 68.

W. guatemalensis—gua-tem-a-len′-sis (from Guatemala). Synonymous with *W. mollis*.

W. hyperborea—hŷp-er-bor′-ĕ-a (from the extreme North), *R. Brown*.

This species, known also in gardens under the name of *W. alpina*, has a remarkably wide range of habitat, being found in the Arctic regions and on high mountains in the temperate zone in Europe, Asia, and America. According to Lowe, it occurs in Sweden, Norway, Russia, Germany, France, Switzerland, Spain, Hungary, Silesia, Siberia, &c., and also in the Punjab, on the Himalayas. Eaton states, in "Ferns of North America" (vol. ii., p. 108), that the limits of its habitat in British America have not been ascertained, and that it grows in the northern parts of Vermont and New York. He adds, "I am indebted to Mr. D. A. Watt for a very copious series of specimens collected by himself on a moist, mossy bank near the Falls on the Rivière du Loup, and within reach of the spray from the Falls, in September, 1865, and on moist, mossy banks in a ravine at Temiscouata, Canada East, 1868." Ray mentions *W. hyperborea* as a British plant in the second edition of his "Synopsis Stirpium Britannicarum" (published in 1696), where it is described by Mr. Lhwyd, its discoverer, as "*Filix alpina pedicularis rubræ foliis subtus villosis*" (Alpine Fern, with red-stemmed leaves hairy underneath). It was also described and engraved during the same year in Plukenet's "Almagestum Botanicum" (p. 150, t. 89, f. 8). Mr. Lhwyd says he never saw it except on wet, lofty rocks called Clogwyn-y-Garnedh, near the top of Snowdon, and that it was rare even there. It springs there from the edges of the rocks, and is not erect, but somewhat reclining. Dr. Richardson adds, in the third edition of the same "Synopsis," that "it grows on a moist, black rock, almost at the top of Clogwyn-y-Garnedh, facing north-west, directly above the lower lake." Besides the above-named locality, Lowe states that this species "has been found in various places in Scotland, viz., by Professor Balfour near Crieff, on Ben Chonzie, Perthshire; also in Glen Isla, Forfarshire; and on Glen Fiadh, Clova Mountains. Mr. Dickson and

Mr. W. Wilson found it on Ben Lawers, Maeldun-Crosk, and Craig Challiach, in Perthshire; and Mr. J. T. Syme, between Glen Lochy and Glen Dochart."

The fronds (Fig. 107), narrowly spear-shaped, pinnate, and 2in. to 6in. long, are abundantly produced from a clustered rootstock, hidden by a mass of stalk-bases, which persist long after the fronds have fallen off. The stalks are articulated, and, like the midrib of the leafy portion, slightly hairy beneath. The somewhat triangular leaflets are deeply cleft into roundish or egg-shaped lobes of a pale green colour. —*Hooker*, *Species Filicum*, i., p. 64; *British Ferns*, t. 7. *Nicholson*, *Dictionary of Gardening*, iv., p. 216. *Lowe*, *Our Native Ferns*, ii., t. 69. *Eaton*, *Ferns of North America*, t. 60. *Moore*, *Nature-printed British Ferns*, t. 47B. *Correvon*, *Les Fougères rustiques*, p. 66.



Fig. 107. Woodsia hyperborea (½ nat. size).

W. ilvensis—il-ven′-sis (from Elba), *R. Brown.*

Like the foregoing species, this has a very wide range of habitat, which in fact is very similar to that of *W. hyperborea*, and, like that species also, this is one of the rarest of British Ferns. We have it on the authority of Lowe that the Rev. W. Little found it in Scotland, near Loch Skene, in Dumfries-shire; Mr. P. Gray, to the north of Moffat; Mr. W. Stevens, abundantly on the hills dividing Dumfries and Peebles-shire; and that by various other persons it has been collected near Crieff, on Ben Chonzie, Perthshire, and on Ben Lawers by Mr. J. Backhouse, who also saw it on the Clova Mountains, at Glen Fiadh, &c. Eaton, in "Ferns of North America" (vol. ii., p. 112), states that "it is found on high, exposed rocks and in their crevices, in the mountainous regions of the Northern United States, and throughout British America, as far as the Rocky Mountains and Norway House, on the Saskatchewan River. In New England it is sometimes found at low elevations near the sea, as on Mount Desert Island, Maine. It is particularly fine and abundant on the tops of the mountains above West Point, on the Hudson River, and along the Saguenay River, in Canada." It is also found in the Caucacus, in Siberia, and all through Northern Europe.

The spear-shaped fronds (Fig. 108) of this species, 2in. to 6in. long and pinnate, are produced from a clustered rootstock. They are provided with stalkless, blunt, oblong leaflets, broader at the base, slightly hairy above, and deeply cleft into many oblong, obscurely-toothed lobes of a dull green colour. The rachis (stalk of the leafy portion) and the secondary midribs have their under-side clothed with reddish, chaffy scales.—*Hooker*, *Species Filicum*, i., p. 63 ; *British Ferns*, t. 8. *Nicholson*, *Dictionary of Gardening*, iv., p. 216. *Lowe*, *Our Native Ferns*, ii., t. 70. *Eaton*, *Ferns of North America*, t. 60. *Moore*, *Nature-printed British Ferns*, t. 47A. *Correvon*, *Les Fougères rustiques*, p. 67.



Fig. 108. Woodsia ilvensis (¼ nat. size).

W. incisa—in-ci′-sa (cut). This is synonymous with *W. obtusa*.

W. (Physematium) insularis—Phy-se-mat′-ĭ-um ; in-sul-a′-ris (insular), *Hance.*

A small-growing species, of little decorative value, native of China.—*Hooker*, *Synopsis Filicum*, p. 47.

W. lanosa—la-no′-sa (woolly), *Hooker.*

This distinct species is a native of Northern India ; it has been found on the mountains of Kumaon at 11,000ft. to 12,000ft. elevation, and in Sikkim at altitudes varying between 14,000ft. and 16,000ft. Its oblong, pinnate fronds are quite shaggy with copious, soft, long, rusty-coloured hairs, mixed with very narrow, long, chaffy scales. The leaflets, somewhat heart-shaped and toothed, are scarcely cleft again. This plant has much the appearance of a densely-woolly form of *W. hyperborea*.—*Hooker*, *Synopsis Filicum*, p. 47. *Beddome*, *Ferns of British India*, t. 341.

W. Lyallii—Ly-al′-lĭ-i (Lyall's). Synonymous with *W. scopulina.*

W. (Physematium) manchuriensis—Phy-se-mat′-ĭ-um ; man-chu′-rĭ-en′-sis (Manchurian).

A species of medium dimensions, native of Manchuria and Japan. Its oblong-spear-shaped, sharp-pointed fronds, 6in. to 8in. long, are once divided to the midrib into stalkless leaflets 1in. or more in length, of a thin texture, and deeply cleft into oblique, egg-shaped, blunt, entire or slightly wavy lobes, each of which bears one spore mass only.—*Hooker*, *Second Century of Ferns*, t. 98.

W. (Physematium) mollis—Phy-se-mat′-ĭ-um ; mol′-lis (soft), *J. Smith.*

According to Lowe, this species, also known in gardens under the names of *W. fragilis* and *W. guatemalensis*, and native of Mexico, Guatemala, Minas-Geraes (Brazil), and the Andes of Peru and Quito, was introduced into the Royal Gardens, Kew, in 1841. Its fronds, which are spear-shaped and pinnate, are generally densely clothed, especially beneath, with soft, jointed hairs ; their oblong-spear-shaped leaflets are somewhat blunt, stalkless, and deeply cleft into oblong or oval, stalkless pinnules (leafits), rounded at the summit and notched on the margins.—*Hooker*, *Species Filicum*, i., p. 60. *Nicholson*, *Dictionary of Gardening*, iv., p. 216.



Fig. 109. Woodsia obtusa
(¼ nat. size).

W. (Physematium) obtusa—Phy-se-mat′-ĭ-um ; ob-tu′-sa (blunt), *Torrey.*

According to Lowe, this somewhat strong-growing species, native of North America, Peru, and Uruguay, was cultivated in the Royal Gardens, Kew, as far back as 1836. Eaton, in his splendid work on "Ferns of North America," states (vol. ii., p. 190) that it grows on rocks and stony hillsides and is not

rare from New England to Wisconsin and southwards to Georgia, Central Alabama, Arkansas, and the Indian Territory ; that it also occurs in British Columbia, where Dr. Lyall found it on the Galton Mountains, but that it is not known in the eastern provinces of Canada. Although its fronds, produced from a tufted rootstock, are usually 6in. to 9in. long and 2in. to 3in. broad, Eaton states that they occasionally measure 1¼ft. long and 4in. broad at their middle ; they are borne on non-articulated stalks 3in. to 6in. long, and are (Fig. 109) twice divided to the midrib. The stalkless leaflets are opposite and cut into oblong leafits that are rounded at the summit and notched along the margin. *W. incisa* and *W. Perriniana* are identical with this species.—*Hooker*, *Species Filicum*, i., p. 63 ; *Garden Ferns*, t. 43. *Nicholson*, *Dictionary of Gardening*, iv., p. 216. *Eaton*, *Ferns of North America*, t. 71. *Lowe*, *Ferns British and Exotic*, vii., t. 29. *Correvon*, *Les Fougères rustiques*, p. 68.

W. (Physematium) oregana — Phy-se-mat′-ĭ-um ; or-eg-a′-na (from Oregon), *Eaton.*

This species is essentially of North American origin. Eaton states ("Ferns of North America," vol. ii., p. 185) that it is found growing in dense patches in the crevices of rocks, often where much exposed to the sun, from Oregon and British Columbia eastward to Lake Winnipeg and the Kewcenaw Peninsula of Michigan, and southward to Wyoming, Utah, Colorado, and Arizona ; he adds that it has also been found in California, forming masses around lava rocks in high plateaus along the Pitt River. Its oblong-spear-shaped fronds, 3in. to 4in. long, are borne on densely-tufted, non-articulated stalks 2in. to 4in. long ; they are twice divided to the midrib and their leaflets are cut into blunt, oblong, notched lobes of a dark green colour and smooth on both sides. —*Hooker*, *Synopsis Filicum*, p. 48. *Nicholson*, *Dictionary of Gardening*, iv., p. 217. *Eaton*, *Ferns of North America*, t. 71. *Correvon*, *Les Fougères rustiques*, p. 69.

W. Perriniana—Per-ri-nĭ-a′-na (Perrin's). Synonymous with *W. obtusa.*

W. (Physematium) polystichoides—Phy-se-mat′-ĭ-um ; pol-ys′-tich-ŏ-i′-dēs (Polystichum-like), *Eaton.*

A very pretty, free-growing species, native of Japan, with spear-shaped, simply-pinnate fronds 8in. to 10in. long. The stalkless leaflets are about

1in. long, sharply eared at the superior base, entire or slightly notched at the extremity, and slightly hairy on both sides ; their colour is a bright green and their texture is thicker than that of most of the other species in cultivation.—*Hooker*, *Second Century of Ferns*, t. 2. *Nicholson*, *Dictionary of Gardening*, iv., p. 217.

W. p. sinuata—sin-ŭ-a′-ta (wavy), *Hooker.*

This form, native of Manchuria, differs from the typical plant only in the greater size of its leaflets, which are broader, more blunt, and so much waved along the edge as to be lobed or even pinnatifid (divided nearly to the midrib).—*Hooker*, *Synopsis Filicum*, p. 48.

W. p. Veitchii—Veitch′-ĭ-i (Veitch's), *Moore.*

On account of the thick, silvery down with which all the parts of the plant are clothed, this is a very decorative form. As regards the dimensions, habit, and hardihood, it is equal to the typical species. This lovely variety is a native of Ta-lien-kwan, Yellow Sea, China.—*Hooker*, *Garden Ferns*, t. 32. *Nicholson*, *Dictionary of Gardening*, iv., p. 217.

W. (Physematium) scopulina—Phy-se-mat′-ĭ-um ; scop-ul-i′-na (brush-like), *Eaton.*

Although Baker considers this to be scarcely more than a variety of *W. obtusa*, Eaton, who states that it is found growing in dense masses on rocks and in crevices from Oregon to Mono Pass, California, and extending eastward to Dakota, Minnesota, and Colorado, says that it is so much like *W. oregana* that, unless the specimens are in good condition, it is difficult to distinguish them. Eaton further says that the most important distinction rests in the indusium, which is not always in condition to admit of satisfactory examination. *W. Lyallii* is synonymous with this species.—*Hooker*, *Synopsis Filicum*, p. 48. *Eaton*, *Ferns of North America*, t. 71.

CHAPTER XXIII.

WOODWARDIA, *Smith.*

(Wood-ward′-ĭ-a.)

Chain Ferns.



HIS genus, which is a part of the tribe *Blechneæ*, and was named after Thomas Jenkinson Woodward, an English botanist, is composed of about half-a-dozen distinct species, of large or medium dimensions. In Hooker and Baker's "Synopsis Filicum," *Woodwardia* forms Genus 36. Its distinctive character resides in the disposition of the sori (spore masses), which are linear (narrow) or linear-oblong, and sunk in cavities of the frond placed in single rows parallel with and contiguous to the midribs of the pinnæ and pinnules (leaflets and leafits); they are covered by an involucre of a somewhat leathery texture, of the same shape as the spore masses, and closing over the cavity like a lid. In *Woodwardia* proper the veins always form a series of costal arches, while in the remainder of the species they are either quite free or anastomosing (intercrossing each other).

Although only a small genus, *Woodwardia* is sub-divided, according to the nature of the veins, into three sections as follow :

Anchistea (Anch-is′-tĕ-a), *Presl.* The plants of this section have uniform fronds, with all their veins free between the sori and the margin.

Euwoodwardia (Eu-wood-ward′-ĭ-a), or true *Woodwardia.* In this section the fronds are uniform, and their veins form at least one series of areolations (cells or cavities) between the sori and the margin.

Lorinseria (Lor-in-se′-rĭ-a), *Presl.* In outward appearance the plants belonging to this section are totally different from those of the two foregoing sections: their fronds are dimorphous, the barren and the fertile ones being quite distinct, and their veins anastomosing throughout.

Culture.

Woodwardias are indigenous to the North Temperate zone, extending but very slightly within the tropics. They all possess a decorative character for either the cool greenhouse, the conservatory, or the hardy Fernery, according to their requirements. Few Ferns are as effective as *W. radicans* or *W. orientalis*, grown either on the rockery or in a hanging basket in the conservatory; while *W. areolata* (or, as it is usually called in gardens, *W. angustifolia*) and *W. virginica* are very ornamental when planted in a marshy part of the hardy Fernery. The compost in which Woodwardias thrive most luxuriantly is a mixture in equal parts of fibrous loam, peat or leaf-mould, chopped sphagnum, and silver sand, with abundance of water at the roots all the year round. It is of the utmost importance that these plants should be strictly kept under cool treatment, as when subjected to heat they soon become a prey to thrips and scale, whereas when grown in a cool atmosphere they are usually very clean plants.

Although Woodwardias may be, and sometimes are, propagated from spores, they are usually increased by means of the young bulbils produced either towards the end of their fronds, as in *W. radicans* and its varieties, or over the whole of their surface, as in *W. orientalis*. The hardy kinds are also easily multiplied by the division of their rhizomes—an operation which is more successfully performed from November to March than at any other time of the year.

Principal Species and Varieties.

W. angustifolia—an-gus-tif-ol′-ĭ-a (narrow-fronded). Synonymous with *W. areolata*.

W. (Lorinseria) areolata—Lor-in-se′-rĭ-a; ar-ĕ-ol-a′-ta (areolate), *Moore.* Though not very widely distributed, this handsome species (see Coloured Plate), of essentially North American origin, is, according to Eaton, plentiful

in certain localities from Massachusetts to Florida and Louisiana, where it is found growing in swampy woods, and apparently never very far from the coast. According to Lowe, it was introduced into the Royal Gardens, Kew, in 1830. The barren and fertile fronds are totally different; both kinds are produced from a rootstock sometimes 1ft. long, often branched, round, about



Fig. 110. Barren Frond of Woodwardia areolata
(½ nat. size).

¼in. thick, of a very dark brown colour, and bearing black, fibrous roots along its whole length. The barren fronds (Fig. 110) are by far the more abundant; they are borne on a short, slender stem, are 9in. to 12in. long and 6in. to 8in. broad, and are furnished with numerous pairs of oblong-spear-shaped, wavy leaflets, 3in. to 4in. long, ½in. to ¾in. broad, of a soft, papery texture, and naked on both surfaces. The fertile fronds, considerably taller

than the barren ones, and borne on a longer and much darker-coloured stalk, are erect, and provided with narrow-linear leaflets, disposed ½in. to 1in. apart. *W. angustifolia* is synonymous with this species.—*Hooker*, *Species Filicum*, iii., p. 70 ; *Garden Ferns*, t. 61. *Nicholson*, *Dictionary of Gardening*, iv., p. 217. *Lowe*, *Ferns British and Exotic*, iv., t. 46.

W. (Lorinseria) Harlandii—Lor-in-se′-rĭ-a ; Har-land′-ĭ-i (Harland's), *Hooker.*

A species from Hong-Kong, with barren and fertile fronds totally different. The former vary in shape from narrowly-spear-shaped and undivided to broadly-egg-shaped with one or two spreading spear-shaped lobes 3in. to 4in. long and ½in. to ¾in. broad, reaching down to a broadly-winged midrib ; they are borne on erect, nearly naked stalks 6in. to 8in. long, are of a leathery texture, and are naked on both surfaces. The fertile fronds are provided with more numerous and narrower lobes, the lowest pair often quite free from the others.—*Hooker*, *Species Filicum*, iii., p. 70 ; *Filices Exoticæ*, t. 7. *Nicholson*, *Dictionary of Gardening*, iv., p. 217.

W. (Anchistea) japonica — Anch-is′-tĕ-a ; jap-on′-ic-a (Japanese), *Swartz.*

This species, native of China and Japan, has broadly-egg-shaped fronds 1ft. to 1½ft. long, 9in. to 12in. broad, and borne on erect stalks 6in. to 12in. long and scaly below. The spear-shaped leaflets, often 6in. long and 1¼in. broad, are deeply cleft into lobes about ¼in. broad, which reach half or two-thirds of the distance down to the rachis. The lines of spore masses, which margin the midribs of the leaflets, are confined to the upper part of the upper ones.—*Hooker*, *Species Filicum*, iii., p. 69. *Nicholson*, *Dictionary of Gardening*, iv., p. 217.

W. orientalis—or-ĭ-en-ta′-lis (Eastern), *Swartz.*

A very distinct and highly decorative species, found from Japan southward to Formosa. It has somewhat the habit of the better-known *W. radicans*, to which it is closely related, but in general appearance its fronds are readily distinguished from those of that species (1) by their much more leathery texture, (2) by their deep crimson colour when young, and (3) by the numberless minute bulbils, or gemmiferous buds, which are produced on their

upper surface when mature—all characters which do not exist in *W. radicans*. *W. orientalis* is a strong-growing plant with fronds 4ft. to 8ft. long and 1½ft. to 2ft. broad, borne on stout, round stalks densely clothed at the base with large, chaffy, pale, spear-shaped scales. The spear-shaped leaflets, sometimes more than 1ft. long, are cut down below nearly to the rachis into wavy or deeply-cleft leafits sometimes 4in. long, those of the under-side being usually shorter and the base of the leaflets being deprived of them.—*Hooker*, *Species Filicum*, iii., p. 68. *Nicholson*, *Dictionary of Gardening*, iv., p. 217

W. radicans—ra-di'-cans (rooting), *Smith.*

This exceedingly handsome, strong-growing, evergreen Fern derives its specific name from the viviparous character of its fronds, which, unlike those of the foregoing species, have only from two to four large bulbils produced at their extremity ; these root into any damp material with which they may be brought into contact, rapidly forming young plants similar to the parent. It is a native of Madeira, the Canary Islands, the South of Europe, Peru, Mexico, &c. In North America, Eaton says ("Ferns of North America," vol. ii., p. 118), it is found "by living streams in shaded places, especially in valleys and cañons of the coast ranges, and of the Sierra also, in California from Long Valley to San Diego, and other localities." Beddome gives it as a native of the Himalaya Mountains, where it is found at altitudes varying between 4000ft. and 5000ft. Lowe also states ("Ferns British and Exotic," vol. iv., p. 108) that Leibmann found it at elevations of from 4000ft. to 8000ft. ; Galeotti from 9000ft. to 12,000ft., and Dr. Schiede at Jalapa. He adds that it was introduced into the Royal Gardens in 1779. Its elegantly pendulous fronds, borne on strong, round stalks 1ft. to 2ft. long, are 3ft. to 6ft. long, 1½ft. to 2ft. broad, and simply pinnate. The oblong-spear-shaped leaflets, about 1ft. long, are cut down below within a short distance of the rachis into finely-toothed, spear-shaped, bright green leafits. Near the extremity of each frond usually one plant (sometimes as many as four) is produced, which will grow to a considerable size whilst on the frond ; indeed, it is not at all uncommon to see plants with half-a-dozen fronds 1ft. long receiving all their support from the parent frond.—*Hooker*, *Species Filicum*, iii., p. 67. *Lowe*, *Ferns British and Exotic*, iv., t. 44. *Eaton*, *Ferns of North America*, t. 61. *Beddome*, *Ferns of British India*, t. 88.

W. r. Brownii—Brown′-ĭ-i (Brown's). Synonymous with *W. r. cristata.*

W. r. Burgesiana—Bur-ges-ĭ-a′-na (Burges's), *Stansfield.*

This variety, introduced from the Azores, is of quite distinct appearance. Its very handsome, light, elegant fronds, which sometimes attain 2½ft. in length, have their leaflets and leafits uniformly depauperated ; they are of a somewhat harsh, leathery texture and beautifully saw-toothed throughout. It is as proliferous as the species from which it is issue, and is readily propagated by the pegging-down of the bulbils borne at the extremity of the fronds.

W. r. cristata—cris-ta′-ta (crested), *Moore.*

In this variety, which was originally discovered in the Island of St. Michael by Mr. George Brown, the leaflets and leafits of the fronds, which are much shorter than those of the typical plant, are extensively subdivided ; the latter are deeply cleft at their summit and form along the sides of the fronds a row of tufted branches or crests starting from the leaflets almost at right angles. The terminal crests, larger than the lateral ones, are frequently 4in. in width and are composed of innumerable small, excurrent points. This variety is readily increased by the viviparous buds which are produced at the ends of the fronds, as in the typical plant, and it is also worthy of notice that the characters peculiar to *cristata* are quite apparent in young plants only a few inches high. *W. r. Brownii* is another name for this variety.

W. (Anchistea) virginica—Anch-is′-tĕ-a ; vir-gin′-ic-a (Virginian), *Smith.*

A very pleasing, hardy Fern, of deciduous nature and essentially of North American origin. Eaton says that it is "a rather rare Fern, though plentiful in certain localities ; it grows in swamps often where the depth of water renders the plant almost inaccessible." The same authority gives its range of habitat as from Canada and New England to Florida, westward to Louisiana. According to Lowe, it was cultivated in the Royal Gardens, Kew, in 1834, but Nicholson gives 1774 as the date of its introduction into Britain. Its oblong-spear-shaped fronds, 1ft. to 1½ft. long, 6in. to 9in. broad, and borne on strong, erect stalks 1ft. to 1½ft. long, are produced from a rootstock nearly as thick as a man's little finger : this creeps just beneath the surface of the firm mud at the bottom of the shallow ponds in which it prefers to grow.

Eaton further states that "in season, when the ponds are nearly dry, the rootstock may be traced a long distance from the fronds"; and as illustrating this remark he adds: "I have torn up a rootstock 10ft. long and over 6ft. undecayed; it is irregularly branched, soft and fleshy." The leaflets are narrow-spear-shaped, 4in. to 6in. long, about 1in. broad, and cut down nearly

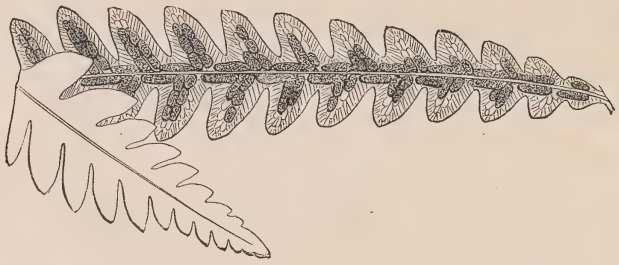


Fig. 111. Pinna of Fertile Frond of Woodwardia virginica (nat. size).

to the rachis into broadly-oblong lobes of a pale green colour. The sori (spore masses) are very conspicuous.—*Hooker*, *Species Filicum*, iii., p. 69. *Nicholson*, *Dictionary of Gardening*, iv., p. 218. *Eaton*, *Ferns of North America*, t. 52. *Lowe*, *Ferns British and Exotic*, iv., t. 45.

CHAPTER XXIV.

SELAGINELLA, *Spring.*

(Sel-a-gin-el′-la.)

Club Mosses.



N his exhaustive and excellent work, the "Handbook of the Fern-Allies," Mr. J. G. Baker very succinctly enumerates and describes those plants which, like Ferns, produce spores from which they are or may be readily increased. Under the appellation of "Fern-Allies" Baker gives the classification and descriptions of *Azolla*, *Equisetum*, *Isoetes*, *Lycopodium*, *Marsilea*, *Pilularia*, *Psilotum*, *Salvinia*, *Selaginella*, and *Tmesipteris*. Of the above-named genera, all very interesting in themselves, *Selaginella* is the only one which, from a decorative point of view, deserves special attention. Whereas one may occasionally, but very seldom, find in cultivation one or a few of the plants belonging to the other genera, Selaginellas are extensively grown both in private establishments and in nurseries. It may in fact be said that of all "Fern-Allies" this is the only genus which deserves and receives any attention at the hands of gardeners, who frequently, though erroneously, refer to these plants as Lycopodiums, from which they differ in their dimorphic spores and sporangia.

The distinguishing characters of *Selaginella* reside in the disposition of the leaves, which are arranged on two planes, those of the upper plane usually much smaller than those of the lower, and in the presence of sporangia of two kinds: macrosporangia and microsporangia, not contained in any exterior wrapper, but placed in the axils of altered or unaltered leaves upon

a produced or condensed stem, so as to form a dense spike at the end of the leafy branches. The microsporangia, which are by far the more plentiful, contain numerous very minute, dust-like microspores. The macrosporangia, which contain four or fewer macrospores — much larger, globose, generally chalk-white, and furnished with three ribs, which develop a minute female prothallium, remaining permanently attached to the spore—are few and are confined to the base of the spike.

The name *Selaginella* is a diminutive of *Selago*, the old name for another Lycopod. The genus is a very extensive one, comprising upwards of 300 species of stove, greenhouse, and hardy, evergreen plants much resembling mosses ; but, on account of the difficulties attending their importation and the germination of their spores after a long journey, a great number of them are not in cultivation. In his admirable work above quoted, Baker divides the Selaginellas into six series as follow :

I. Decumbentes (De-cum-ben′-tes). This is the most extensive series ; it comprises dwarf species with the main stem decumbent and root-fibres extending to its upper nodes. They may be (1) persistent species with leaves of firm or moderately firm texture, continuous stems, and leafy branches, like the Asiatic and European *S. helvetica* and the West Indian *S. serpens ;* or (2) persistent species with articulated stems, such as the West Indian *S. Martensii stolonifera ;* or (3) fugacious species—tropical annuals of the rainy season—with continuous stems such as the Asiatic *S. nipponica* or the American *S. apus.*

II. Ascendentes (As-cen-den′-tes). The plants forming this series have ascending stems, branched to the base, with the root-fibres confined to the nodes of the lower half. They may be (1) persistent species with continuous stems and broad, leafy branches, such as the West Indian *S. setigera*, the African *S. Kalbreyeri*, or the American *S. Martensii ;* or (2) persistent species with articulated stems, such as *S. Galeottei ;* or (3) fugacious species—tropical annuals of the rainy season—with unjointed stems, such as *S. Poulteri.*

III. Rosulatæ (Ros-ul-a′-tæ). In this series, the plants have their stems densely tufted, curling up in drought, sometimes, but not always, branched down to the base, the root-fibres being confined to the base. *S. involvens*, of the Old World, and *S. lepidophylla*, of the New World, well illustrate this series.

IV. Sarmentosæ (Sar-men-to′-sæ). This series is formed of persistent species with elongated stems, branched nearly or quite to the base. These characters are well shown in the Polynesian *S. gracilis*, the Asiatic *S. inæqualifolia*, and the East Indian *S. Wallichii*.

V. Scandentes (Scan-den′-tes). Three species only are included in this series, and these are persistent, with wide-climbing, continuous stems. *S. Willdenovii* (*S. cæsia arborea* of gardens) furnishes the best illustration in this case.

VI. Caulescentes (Cau-les-cen′-tes). The plants comprised in this series are persistent species with upright stems, simple in the lower part, decompound and frond-like upwards, with the root-fibres confined to the base ; as seen in the Asiatic *S. caulescens*, in the African *S. Vogelii* (*S. africana* of gardens), and in the American *S. hæmatodes*.

As may be seen from the foregoing list, the first and second series are divided in their turn into groups according to their foliage being fugacious or persistent, and their stems continuous or articulated, each group in Baker's work showing the number of known species peculiar to separate habitats, which are divided into African, American, Asiatic, Australian, and European. The above arrangement is very comprehensive, and anyone particularly interested in this beautiful genus cannot do better than refer, for further and more detailed particulars, to Baker's "Handbook of the Fern-Allies." The only drawback in connection with this work—and it is a serious one in the case of gardeners—consists in Baker's nomenclature and the gardeners' nomenclature being much at variance. The names under which certain old species have long been known by gardeners—such as *S. africana*, *S. cæsia arborea*, *S. conferta*, *S. denticulata*, *S. Willdenovii*, which have individually become *S. Vogelii*, *S. Willdenovii*, *S. canaliculata*, *S. Kraussiana*, and *S. Braunii*—are, for the most part, simply garden names adopted and consecrated by usage ; but as we have been unable to refer these to any authorities, we have deemed it more in accordance with the plan of our work to adopt or retain the names having for authorities such specialists as Baker, Spring, &c., and under which these plants have for upwards of twenty years been known in our botanic gardens and herbaria. However, with a view to facilitating the adoption of these names by the general public and cultivators, we give the garden names in their proper alphabetical order.

Culture.

The habitat of the genus *Selaginella* is comparatively restricted: two species only extend their range into Europe; the Selaginellas of the Cape, Temperate Australia, and South Temperate America are neither numerous nor remarkable; and the greater part of the species come from Tropical America, so that the genus may be said to be concentrated in the tropical zone. Most of them are of very easy culture, and as a rule invaluable for decorative purposes; their elegance can hardly be overrated, and their powers of endurance in many instances prove sufficiently satisfactory to enable growers to utilise them for decoration.

Selaginellas are readily propagated from cuttings made from their creeping stems, which emit roots at nearly every joint. The layering of the fronds by pegging firmly on a constantly damp, mossy surface is a rapid method of producing very handsome plants, and this operation may be performed with equal success at almost any time of the year. In private establishments especially, where the demand for decorative plants is great, and where greater difficulties are encountered in the propagation of Ferns, these useful plants may be increased at a rapid rate and with comparatively little trouble.

With very few exceptions, Selaginellas require a warm, close, moist atmosphere, where draughts are carefully excluded, although some of them are quite at home in a temperate house, and a few are even hardy in a sheltered position out of doors. The temperature most suitable for the bulk of them is from 65deg. to 70deg., and they will, by growing more luxuriantly, give even more satisfaction if the atmosphere can be kept at from 70deg. to 75deg. all the year round.

There are various ways of growing Selaginellas. They delight in any light soil, and it should be kept open by intermixing charcoal or small potsherds through it. Growing them in shallow pans is the best method of cultivation, as, with the exception of the plants belonging to the *rosulatæ* section, they all require room to spread, and most of them root upon the surface of the soil only. They should be kept on the shady side, or at one end of the house; in any case it will be found beneficial to have them in such a position that there may be a certain amount of constant moisture

about them. To that effect, they should be placed on a solid bed which constantly gives off moisture, or, if this is impracticable on account of the house being provided with permanent stages, these should be covered with sphagnum, to be kept wet; and the pans should not be allowed to rest directly on the moss, but be set up above it upon three small pots or on an inverted pan, so as to avoid all direct contact with the saturated material. Plants so arranged will derive all the benefit of the surrounding moisture without their soil becoming sour. Although they have a particular dislike to standing permanently in the wet, Selaginellas require copious waterings at the roots, and for that reason it is necessary that their pots or pans shall be thoroughly well drained. They should not be syringed overhead, or only very sparingly during the hot summer days, as their massive though feathery fronds cannot long endure being wetted.

Principal Species and Varieties.

S. affinis—af-fi′-nis (related), *A. Braun.*

This stove species, better known in gardens as *S. rigida*, is a native of Guiana. Its stems, 1ft. or more in length, and of a trailing nature, are jointed at the nodes, and forked low down into copiously-divided branches. The fruiting spikes are ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 63. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. africana—af-ric-a′-na (African). A garden name for *S. Vogelii.*

S. albo-nitens—al-bo–nit′-ens (shining-white), *Spring.*

A greenhouse species, of slender, trailing habit, with stems copiously pinnate, their upper branches simple, and the lower slightly divided. The leaves of the lower plane, spaced on the main stem, are spreading, spear-shaped, bright green, very narrow, unequal-sided, and shortly ciliated; those of the upper plane are one-third as long and distinctly cuspidate (having a sharp, stiff point). The fruiting spikes are ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 72. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. amœna—am-œ′-na (pleasing). A variety of *S. caulescens.*

S. apoda—ap′-od-a (footless). A garden name for *S. apus.*

S. apus—a′-pus (footless), *Spring.*

This greenhouse species, more extensively known in gardens under the names of *S. apoda* and *S. densa*, is a native of Canada and the United States of America, where it occurs as far as Texas, and is interesting geographically as a representative in the temperate zone of a characteristically tropical group. Its slender, trailing, densely-matted stems, 1in. to 4in. long, are either simple or forked. The leaves of the lower plane are spaced below the tips of the branches, egg-shaped or unequal-sided ; those of the upper plane are shortly pointed. The fruiting spikes, ¼in. to ½in. long, are usually erect. This is one of the most useful species for pot culture and for edging. *S. a. denticulata* is synonymous with *S. ludoviciana.—Baker, Handbook of the Fern-Allies*, p. 71. *Nicholson, Dictionary of Gardening*, iii. p. 409.

S. argentea—ar-gen′-tĕ-a (silvery). A variety of *S. caulescens.*

S. atroviridis—a′-tro-vir′-id-is (dark green), *Spring.*

This strong-growing, stove species is one of the most distinct in cultivation ; its peculiar, metallic, dark green colour and its upright habit render it quite different from any other species in cultivation. It is a native of Madras, Malaysia, South China, Hong-Kong, and Formosa. The stems, 1ft. long, are flat on the back, have the root-fibres confined to their lower part, and are repeatedly branched. The leaves of the lower plane, closely disposed on both stem and branches, are rather firm in texture, unequal-sided, broadly rounded, more or less distinctly ciliated, and overlap the stem on the upper side at the base ; the leaves of the upper plane are half as long, oblong, with a sharp point, and much overlap. The fruiting spikes, which are square, are generally from ½in. to 1in. long.—*Baker, Handbook of the Fern-Allies*, p. 77. *Nicholson, Dictionary of Gardening*, iii., p. 409.

S. azorica—az-or′-ic-a (from the Azores), *Baker.*

A small, greenhouse species, of little decorative value, native of the mountains of the Azores.—*Baker, Handbook of the Fern-Allies*, p. 50.

S. Bakeriana—Ba-ker-ĭ-a′-na (Baker's), *Bailey.*

A very pretty, widely-trailing, greenhouse species, native of Queensland, and much in the way of *S. uncinata.* The bright green leaves are moderately

firm in texture and the copious fruiting spikes are square, 1in. to 2in. long, and slender.—*Baker*, *Handbook of the Fern-Allies*, p. 49.

S. bellula—bel′-lul-a (very pretty). This is the same plant as *S. perelegans*, which is a variety of *S. inæqualifolia.*

S. brasiliensis—bras-il-ĭ-en′-sis (Brazilian), *A. Braun.*

A small, greenhouse species, common in the Southern half of Brazil; it is closely allied to *S. apus.*—*Baker*, *Handbook of the Fern-Allies*, p. 70.

S. Braunii—Brau′-nĭ-i (Braun's), *Baker.*

This handsome, greenhouse species, native of West China, is generally found in gardens under the names of *S. Willdenovii* and *S. pubescens.* It is a distinctly-marked plant, with upright stems 1ft. to 1½ft. long, of a soft, fragile nature, simple in the lower half, divided and flexuose in their upper portion. The regular, short leaves are liable to be turned inwards at both edges; they are of a dark green colour, moderately firm in texture, and do not overlap the somewhat hairy stems. The abundant fruiting spikes are short and square.—*Baker*, *Handbook of the Fern-Allies*, p. 96. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. Brownii—Brown′-ĭ-i (Brown's). A form of *S. Kraussiana.*

S. cæsia—cæ′-sĭ-a (grey). A garden name for *S. uncinata.*

S. c. arborea—cæ′-sĭ-a; ar-bor′-ĕ-a (tree-like).

The beautiful plant extensively grown in gardens under this name, for which we cannot find any authority, is *S. Willdenovii*, of Baker. It is also frequently met with in commerce under the name of *S. lævigata*, but not of Baker.

S. canaliculata—can-a-lic-ul-a′-ta (channelled), *Baker.*

This handsome, strong-growing, stove species, better known in gardens under the names of *S. caudata*, *S. chinensis*, *S. conferta*, and *S. sinensis*, is a native of the Eastern Himalayas, Burmah, South China, Malaysia, and the Philippine Islands. Its sub-erect, sarmentose stems reach from 3ft. to 4ft. in length; they are provided with lateral branches 4in. to 6in. long, sometimes flexuose and more lengthened, and their lower branchlets are copiously

divided. The leaves of the lower plane are crowded, oblong, pointed at the upper corner, of a bright green colour, moderately firm in texture, nearly square on the lower side at the base, and do not overlap the stem. The leaves of the upper plane, broadly spear-shaped and sharp-pointed, are half as long as the others, and the fruiting spikes are from ½in. to 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 91. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. caudata—cau-da′-ta (having a tail). Synonymous with *S. canaliculata.*

S. caulescens—caul-es′-cens (stemmed), *Spring.*

One of the handsomest of all the cultivated Selaginellas and a native of Japan, China, and the East Indies, where it is said to ascend to 6000ft. elevation. The stems, generally 6in. to 12in. long, are stiffly upright, unbranched in their lower half, with very small, closely-pressed leaves, and much divided in their upper half. The branchlets, close and deltoid (in shape of the Greek delta, Δ), are twice or three times divided to the stem into narrow segments, which are liable to curl up when exposed to drought. The leaves of the lower plane are crowded, sickle-shaped, sharp-pointed, bright green, firm in texture, rather unequal-sided, shortly ciliated on the upper side at the base, and slightly overlap the stem ; those of the upper plane, a third or one-fourth as long, are sharp-pointed and much overlap. The fruiting spikes are square, and from ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 94. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. c. amœna—am-œ′-na (pleasing), *Spring.*

This variety, which differs from the typical plant through the upper part of its stems, 1ft. long, being triangular and pinnately branched, with spreading, distant, acuminate leaves, is a native of Mexico. It is a very useful subject for indoor decoration, the colour of the whole plant being a bright and cheerful green, and its foliage being of a particularly resisting nature in the dry atmosphere of a room.—*Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. c. argentea—ar-gen′-tĕ-a (silvery), *Spring.*

In this variety, native of Malaysia, the branchlets are larger and more compound than in the type. The leaves of the lower plane, broadly spear-

shaped, are bright green on their upper surface and whitish-green beneath.—*Baker*, *Handbook of the Fern-Allies*, p. 95. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. c. japonica—jap-on′-ic-a (Japanese), *Macnab.*

In gardens this variety is extensively grown under the name of *S. c. minor.* It is of small dimensions, seldom exceeding 4in. in height, and its branchlets are not so much divided as those of the typical plant. The leaves of the lower plane are broadly egg-shaped, those of the main stem and branchlets are nearly as broad as long, and the colour of the whole plant is a very pleasing pale green.—*Baker*, *Handbook of the Fern-Allies*, p. 95. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. c. minor—min′-or (small). This is identical with *S. c. japonica.*

S. chinensis—chi-nen′-sis (Chinese). A garden name for *S. canaliculata.*

S. cognata—cog-na′-ta (related). A garden name for *S. Lobbii.*

S. conferta—con-fer′-ta (clustered). A garden name for *S. canaliculata.*

S. convoluta—con-vol-u′-ta (wrapped together), *Spring.*

This stove species, found from Mexico to South Brazil, belongs to the *rosulatæ* section. Its densely-tufted stems, 3in. to 6in. long, are compound nearly to the base, their branches being between simply pinnate and fan-shaped. The leaves of the lower plane conspicuously overlap, and are ascending, egg-shaped, bright green, firm and rigid in texture; those of the upper plane, half as long, are oblique and sharp-pointed. The fruiting spikes are square, and measure ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 88. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. cuspidata—cus-pid-a′-ta (stiff-pointed), *Link.*

A stove species, native of Cuba, Mexico, Guatemala, and New Granada, and belonging to the *rosulatæ* section. Its stems, about 6in. long, are densely tufted and branched nearly or quite from the base, where they are simply pinnate, their branchlets being copiously branched again. The leaves of the lower plane are crowded, ascending, egg-shaped, sharp-pointed, pale green,

white, edged, and rigid in texture; those of the upper plane are nearly as long and have the same sharp-pointed character. The fruiting spikes are ¼in. to ½in. long.

S. c. elongata—e-lon-ga′-ta (lengthened), *Spring.*

In this variety the stems, which reach 1ft. or more in length, are simple in the lower part, and their primary branches are more elongated and more pinnate than in the type.

S. c. Emiliana—E-mil-ĭ-a′-na (Emilie's), *Van Houtte.*

This form, better known in commerce as *S. Emiliana*, is, undoubtedly, the best grower of the whole section, and a plant of unsurpassed merit for decoration. Its handsome branches, 6in. to 9in. long and copiously divided, are abundantly produced; they are of a pleasing light green colour, and upright when young, becoming horizontal, if not pendulous, and of a bright though darker green colour with age. Very handsome, bushy plants of this variety can be grown in comparatively small pots.—*Baker*, *Handbook of the Fern-Allies*, p. 89. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. delicatissima—de-lic-a-tis′-sim-a (very delicate), *A. Braun.*

This greenhouse species, of which the fruiting spikes are unknown, is a very pretty but delicate plant, with thread-like, trailing stems, forked and copiously branched. It was introduced by Linden, but whence is unknown. —*Baker*, *Handbook of the Fern-Allies*, p. 42. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. densa—den′-sa (dense). A garden name for *S. apus.*

S. denticulata—den-tic-ul-a′-ta (small-toothed), *Link.*

This greenhouse species, of prostrate, trailing habit, very much resembles the better-known *S. helvetica*, from which, however, when in fructification, it is readily distinguished by its square fruiting spikes, only ¼in. long and stalkless. It is a native of the Mediterranean region, being found from Madeira and the Canaries to Syria. In exposed places the whole plant sometimes turns bright red when old.—*Baker*, *Handbook of the Fern-Allies*, p. 37. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.



Polypodium subauriculatum

(½ nat. size).

The plant usually found in commerce and very extensively grown for decorative purposes, under the name of *S. denticulata*, is *S. Kraussiana* of A. Braun.

S. dichrous—dich′-rŏ-us (two-coloured).

The plant grown in gardens under this name, for which we can find no authority, is a form of *S. Vogelii*.

S. distorta—dis-tor′-ta (distorted), *Spring*.

A greenhouse species, more curious than ornamental, native of the mountains of Central and Southern Brazil.—*Baker*, *Handbook of the Fern-Allies*, p. 61.

S. d. major—ma′-jor (larger), *Baker*.

A more luxuriant form, with stouter stems, 1ft. or more in length, and often excurrent (protruding at the end), and with the leaves of the lower plane also larger and spreading or rather ascending.—*Baker*, *Handbook of the Fern-Allies*, p. 61. *Nicholson*, *Dictionary of Gardening*, iii., p. 409.

S. divaricata—di-va-ric-a′-ta (divaricate, straggling). One of the numerous garden forms of *S. Martensii*.

S. Douglasii—Doug-las′-ĭ-i (Douglas's), *Spring*.

This greenhouse or nearly hardy plant, of small dimensions, native of British Columbia, Oregon, and Washington Territory, is a well-marked species, with pale, roundish, trailing stems 3in. to 6in. long, forked low down, and pinnately branched, their lower branches being much divided. The leaves of the lower plane, crowded or slightly spaced, are somewhat ascending, pale green, firm in texture, blunt, and nearly flat; they have both sides eared and ciliated at the base, and their upper side much overlaps the stem. The leaves of the upper plane are half as long, oblique-oblong, and sharp-pointed. The fruiting spikes are ½in. to 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 47.

S. elongata—e-lon-ga′-ta (lengthened). A variety of *S. cuspidata*.

S. Emiliana—E-mil-ĭ-a′-na (Emilie's). A form of *S. cuspidata*.

S. erythropus—er-yth′-rop-us (red-footed), *Spring.*

A beautiful, stove species, native of the West Indies, Chili, and Central Brazil, and extensively cultivated in gardens under the name of *S. umbrosa.* Its stems, about 6in. long and of a bright crimson colour, are simple in their lower half or third and branched upwards ; the lower branches are broadly triangular and three times divided again. The leaves of the lower plane, oblong or broadly spear-shaped, are of a bright green colour, moderately firm in texture, unequal-sided, broadly rounded, strongly ciliated, and overlap the stem on the upper side at the base ; those of the upper plane are half as long and sharp-pointed. The fruiting spikes are square.—*Baker*, *Handbook of the Fern-Allies*, p. 103. *Nicholson*, *Dictionary of Gardening*, iii., p. 410.

S. e. major—ma′-jor (large), *Spring.*

In this form the stems are more branched than in the type, their unbranched part is longer, and all the leaves are closely pressed against it. —*Baker*, *Handbook of the Fern-Allies*, p. 103.

S. e. setosa—se-to′-sa (bristly).

According to Baker, the plant grown in gardens under this name, for which we can find no authority, is but a small, starved form of the species. —*Baker*, *Handbook of the Fern-Allies*, p. 103.

S. filicina—fil-ic-i′-na (Fern-like). The plant known by this name is identical with *S. hæmatodes.*

S. flabellata—fla-bel-la′-ta (fan-shaped), *Spring.*

A stove species, of large dimensions, found in the tropical and sub-tropical regions of America and Asia. Its upright stems, 1ft. to 2ft. long, are simple in the lower half and divided in their upper half, the broadly-triangular branches being repeatedly divided into little branchlets. The leaves of the lower plane are sharp-pointed, ascending, of a bright green colour, moderately firm in texture, and distinctly overlap the stem on the upper side at the base ; those of the upper plane are only from one-fourth to one-third as long, egg-shaped, and sharp-pointed. The fruiting spikes are square and ½in. to 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 98. *Nicholson*, *Dictionary of Gardening*, iii., p. 410.

S. flagellata—flag-el-la′-ta (whip-like), *Spring.*

This stove species, of botanical interest only, is a native of French Guiana, where it is found growing on the banks of the streams of Upper Oyapok. —*Baker*, *Handbook of the Fern-Allies*, p. 73.

S. flagellifera — flag-el-lif′-er-a (whip-bearing). A form of *S. plumosa* of Baker.

S. flagelliformis—flag-el-lif-or′-mis (whip-shaped). A garden name for *S. plumosa.*

S. flexuosa—flex-ŭ-o′-sa (bending to and fro), *Spring.*

This stove species, of little decorative value, is a native of South Brazil, where it is said to be common.—*Baker*, *Handbook of the Fern-Allies*, p. 57.

S. formosa—for-mo′-sa (beautiful). A garden form of *S. Martensii.*

S. fulcrata—ful-cra′-ta (fulcrate, propped), *Spring.*

A large and somewhat coarse-growing, greenhouse species, native of the Eastern Himalayas and the mountains of Burmah.—*Baker*, *Handbook of the Fern-Allies*, p. 97.

S. Galeottei—Gal-ĕ-ot′-tĕ-i (Galeotti's), *Spring.*

A stove species, of semi-erect habit, said to be common in Mexico. Its slender stems, 1ft. to 2ft. long, are provided with roots from their lower half and are sometimes whip-like at their summit ; they are flat on the back, bisulcate (twice furrowed) on the face, and copiously branched. The leaves of the lower plane, although close on the branchlets, are spaced on the branches and stem ; they are oblong-spear-shaped and sharp-pointed, of a bright green colour, moderately firm in texture, broadly rounded on the upper side at the base, and eared on the lower. The leaves of the upper plane are one-third to half as long as the others, oblong, sharp-pointed, and much overlap. The fruiting spikes are square and ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 81. *Nicholson*, *Dictionary of Gardening*, iii., p. 410.

S. gracilis—grac′-il-is (slender), *Moore.*

A very elegant, stove species, of light, slender habit, native of the South Sea Islands. Its somewhat upright stems, 2ft. to 3ft. long and somewhat

rough, are pinnately branched; the branches are abundantly produced, spear-shaped, and 4in. to 5in. long, and their branchlets are simple, the lower ones being about 1in. long. The leaves are of a dark, shining green on their upper surface, and moderately firm in texture; those of the lower plane are broadly sickle-shaped, rounded at the base, and attached to the stem on the lower side, while those of the upper plane are broadly spear-shaped, slightly incurved, and sharp-pointed. The fruiting spikes are square and ½in. to 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 90. *Nicholson*, *Dictionary of Gardening*, iv., p. 602.

S. grandis—gran′-dis (great), *Moore*.

This stove species, also known in gardens as *S. platyphylla*, is a native of Borneo. Its erect stems, 1½ft. to 2ft. long, simple in their lower and divided in their upper half, are produced from a creeping, rooting base or stolon as thick as an ordinary lead-pencil. The nature of their branching is midway between fan-shaped and pinnate, and they are of a bold yet graceful habit (see Coloured Plate). The leaves of the lower plane are crowded, spear-shaped, very sharp-pointed, bright green, of a moderately firm texture, and slightly ciliated on both margins; those of the upper plane, one-third as long, are blunt, broadly egg-shaped, and much overlap. The entire leafy portion is of a clear grass-green above and paler beneath. The tail-like fruiting spikes, 1in. to 1½in. long, which are abundantly produced, add greatly to the appearance of this magnificent plant.—*Baker*, *Handbook of the Fern-Allies*, p. 98. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. hæmatodes—hæm-at-o′-dēs (bloody), *Spring*.

One of the handsomest of all the known Selaginellas; it is a stove species, native of the Andes of Venezuela, Peru, and Ecuador. Its robust, erect stems, 1ft. to 2ft. long, of a bright crimson colour, are unbranched in their lower half, while in their upper half the leaves, much spaced and divided, form a massive yet feathery mass of foliage. The leaves of the lower plane, egg-shaped and sharp-pointed, are ascending, bright green, and of a moderately firm texture; those of the upper plane are small and oblique-oblong. The fruiting spikes, 1in. to 1½in. long, are square and abundantly produced. *S. filicina* is identical with this species.—*Baker*, *Handbook of the Fern-Allies*, p. 103. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. helvetica—hel-ve′-tic-a (Swiss), *Link.*

This, the *Lycopodium helveticum* of Linnæus, is a dwarf-growing, greenhouse species, native of Central Europe, Siberia, Persia, North China, and Japan. Its very densely-matted, trailing stems, 2in. to 3in. long, are slender, pale-coloured, forked at the base, distantly pinnately branched, with short, slightly-divided branches. The leaves of the lower plane, oblong or broadly egg-shaped, are closely set, rounded on both sides at the base, pale green, and of a moderately firm texture; those of the upper plane are half as long and sharp-pointed. The fruiting spikes, nearly cylindrical and ½in. to 1in. long, are distinctly stalked.—*Baker*, *Handbook of the Fern-Allies*, p. 37. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. inæqualifolia—in-æ-qua-lif-ol′-ĭ-a (unequal-leaved), *Spring.*

This free-growing and very decorative, stove species is a native of the Eastern Himalayas and of the mountains of Burmah. Its somewhat erect, sarmentose stems, which reach a length of 3ft. to 4ft., are provided with oblong-spear-shaped, much-divided lateral branches about 6in. long. The leaves of the lower plane, broadly egg-shaped and pointed at their summit, are bright green, of a moderately firm texture, rounded on the upper side at their base, and do not overlap the stem; those of the upper plane are half as long, oblique-egg-shaped, and short-pointed. The fruiting spikes are square, and measure ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 91. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. i. perelegans—per-e′-leg-ans (very elegant), *Moore.*

A pretty variety, known also in commerce as *S. bellula.* It is easily distinguished from the typical plant by its dwarf stems, seldom more than 1ft. long, their branches being shorter, more triangular, and much more divided at the base (see Plate, for which we are indebted to Messrs. W. and J. Birkenhead). The fruiting spikes, which are abundantly produced, are often 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 91.

S. involvens—in-vol′-vens (rolled-up), *Spring.*

One of the prettiest of the small-growing Selaginellas in cultivation; it is a greenhouse species, native of Japan, Corea, China, the Philippine Islands, and the Eastern Himalayas. The stems, all produced from a central crown,

are very densely tufted, 2in. to 6in. long, two or three times divided and branched nearly or quite from the base, the branching of all grades being half-way between fan-shaped and pinnate. The leaves of the lower plane, egg-shaped but distinctly pointed, are much crowded, bright green, very thick and rigid in texture, and nearly equal-sided ; those of the upper plane, nearly as long, are broadly spear-shaped and terminate in a distinct, sharp, short point. The fruiting spikes, sparingly produced, are short and square.—*Baker*, *Handbook of the Fern-Allies*, p. 87. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. i. texta—tex′-ta (woven), *J. Makoy.*

In this very peculiar form, which originated in Belgian gardens, the branches are generally simple, though sometimes slightly forked, and average about 6in. in length.—*Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. i. variegata—var-ĭ-eg-a′-ta (variegated), *Moore.*

This form is distinguished from the typical plant only in having the tips of some of the branches creamy-white (see Plate, for which we are indebted to Mr. William Bull).—*Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. japonica—jap-on′-ic-a (Japanese). A variety of *S. caulescens.*

S. Kraussiana—Kraus-sĭ-a′-na (Krauss'), *A. Braun.*

An extremely useful species, which in gardens is found under the names *S. denticulata* and *Lycopodium denticulatum ;* it has a very wide range of habitat, being a native of Cape Colony, Natal, Fernando Po, the Cameroon Mountains, the Azores, Madeira, &c. Its trailing stems, 6in. to 12in. long, are jointed at the nodes, flat on the back, roundish on the face, with copiously-divided branches. The leaves of the lower plane are oblong-spear-shaped, bright green, of a soft texture, and slightly overlap the stem ; those of the upper plane are one-third as long, and egg-shaped. The short fruiting spikes are square.—*Baker*, *Handbook of the Fern-Allies*, p. 65. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

This species has produced three varieties, which in gardens are known as follow: *aurea*, with yellow leaves ; *Brownii*, a dwarf, green form from the Azores ; and *variegata*, having the tips of the young growths quite white.

S. lævigata—læ-vig-a′-ta (smooth), *Baker.*

A stove species, native of Madagascar, with erect stems 1ft. to 1½ft. long, simple in the lower half, broadly triangular in the upper half, the stalked branches, also broadly triangular, being again divided into branchlets 2in. to 3in. long. The leaves of the lower plane, oblong-spear-shaped and sharp-pointed, are crowded, of a bright green colour, firm in texture, and do not overlap the stem; those of the upper plane are very small, spear-shaped, and sharp-pointed. The fruiting spikes are square and ½in. to 1in. long. This must not be confounded with *S. lævigata* of commerce, which is identical with *S. Willdenovii.*—*Baker, Handbook of the Fern-Allies*, p. 100. *Nicholson, Dictionary of Gardening*, iii., p. 411.

S. l. Lyallii—Ly-all′-ĭ-i (Lyall's), *Spring.*

This variety differs from the species in having its fronds more divided, and their lower branches again twice forked, with final divisions sometimes 1in. long. The fructification is also thoroughly distinct: large but short fruiting spikes, like *Juniperus* seeds in miniature, are borne at the extremity of the branchlets (but very sparingly).—*Nicholson, Dictionary of Gardening*, iii., p. 411.

S. lepidophylla—lep-id-oph-yl′-la (scaly-leaved), *Spring.*

This stove species, popularly known as the "Resurrection Plant," is a native of Tropical America, where it is found in exposed places from Texas and Mexico to Peru. It belongs to the *rosulatæ* section, and its densely-tufted stems, 2in. to 4in. long, are branched to the base. The leaves of the lower plane, egg-shaped, blunt, and minutely ciliated, considerably overlap, are of a rigid texture, green on the face, and paler on the back, and when old are tinted reddish-brown; those of the upper plane are nearly as long. The fruiting spikes are square and ¼in. to ½in. long.—*Baker, Handbook of the Fern-Allies*, p. 88. *Nicholson, Dictionary of Gardening*, iii., p. 411.

S. Lobbii—Lob′-bĭ-i (Lobb's), *Moore.*

In gardens, this very handsome plant, native of Borneo and West Sumatra, is also known as *S. cognata.* Its robust, almost climbing stems

reach from 3ft. to 4ft. in length; their broadly-spear-shaped branches, about 6in. long, are wedge-shaped at the base and furnished with branchlets which are forked in their lower and simple in their upper half. The leaves of the lower plane are sickle-shaped and sharp-pointed, bright green, moderately firm in texture, and do not overlap the stem; those of the upper plane are one-third as long and sharp-pointed. The square fruiting-spikes are terminal on the branchlets.—*Baker*, *Handbook of the Fern-Allies*, p. 90. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. ludoviciana—lu-dov-ic-ĭ-a′-na (Louisianian), *A. Braun.*

A very dwarf-growing, greenhouse species, closely allied to *S. apus*, and native of Alabama and Louisiana. It is the *S. apus denticulata* of Spring. —*Baker*, *Handbook of the Fern-Allies*, p. 70.

S. Lyallii—Ly-all′-ĭ-i (Lyall's). A variety of *S. lævigata.*

S. Martensii—Mar-tens′-ĭ-i (Martens'), *Spring.*

Next to *S. Kraussiana* (*S. denticulata* of gardens), this greenhouse species, native of Mexico, where it is abundant, is the commonest Selaginella in European gardens. Its stems are 6in. to 12in. long, upright or nearly so, abundantly furnished with long root-fibres, much divided (the branching being between pinnate and fan-shaped), either flat or roundish on the back, and strongly angled in the lower part on the face. The leaves of the lower plane are usually crowded, oblong-spear-shaped, bright green, moderately firm in texture, unequal-sided, and slightly overlap the stem on the upper side at the base; those of the upper plane are half as long, oblique-oblong in shape, terminating in a sharp, long point, and much overlapping.—*Baker*, *Handbook of the Fern-Allies*, p. 80. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

Under cultivation this species has produced several varieties, the most distinct of which are here described. Their names are of purely garden origin, and are not mentioned by any acknowledged authorities.

S. M. divaricata—di-va-ric-a′-ta (straggling).

A form with fewer and more divaricating branchlets than in the type; it has also smaller and less crowded leaves, of a pale green colour.

S. M. formosa—for-mo′-sa (beautiful).

This variety is of a much slenderer habit than the typical plant; its stems, more erect and of a softer nature, are more divided, and their branchlets have a peculiar drooping habit and are pale green in colour.

S. M. stolonifera—stol-o-nif′-er-a (stolon-bearing).

In habit, this variety resembles *formosa*, but its slender, light branchlets, as well as the stems, are conspicuously upright.

S. M. variegata—var-ĭ-eg-a′-ta (variegated).

The only distinctive character of this form, which is extensively grown for decorative purposes, resides in the nature of its foliage, which is copiously blotched with creamy-white all over the plant.

S. molliceps—mol′-lic-eps (soft-stemmed), *Spring.*

With this very pretty, stove species, of small dimensions, *S. rubricaulis* of A. Braun and of gardens is identical. Its dense, upright stems are of a pale reddish colour, about 6in. long, and copiously divided, their lower branches being again several times forked. The leaves of the lower plane are oblong-spear-shaped, sharp-pointed, very unequal-sided, rounded at the base, and slightly overlap the stem on the upper side at the base; those of the upper plane are half to one-third as long, egg-shaped or broadly spear-shaped, and sharp-pointed. The fruiting spikes, abundantly produced, are resupinate (so turned or twisted that their under-side becomes the upper side) and ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 120. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. mutabilis—mu-ta′-bil-is (changeable). Synonymous with *S. serpens.*

S. nitens—nit′-ens (shining), *Baker.*

This stove species, closely allied to *S. flabellata*, but of smaller dimensions, is a native of Fernando Po and the Cameroon Mountains.—*Baker*, *Handbook of the Fern-Allies*, p. 98.

S. oregana—or-eg-a′-na (from Oregon), *Eaton.*

This singular and very pretty, greenhouse species was discovered by General Kautz in 1855, hanging in dense masses from branches of trees in the

moist forests of Oregon. The stems are pendent, of a peculiarly flaccid nature, 1ft. or more in length, and much branched. The leaves, uniform on both planes, are narrow-spear-shaped, deep green, grooved on the backs, and sharp-pointed, but not bristle-tipped. The slender, square fruiting spikes resemble the sterile branchlets.—*Baker*, *Handbook of the Fern-Allies*, p. 35.

S. patula—pat′-ul-a (spreading), *Spring.*

A greenhouse species, of small dimensions, native of Jamaica and common in cultivation. Its slender, trailing stems, of a pale colour and 6in. to 9in. long, are angled on the faces, with a long, whip-like tip and numerous closely-arranged branchlets. It grows very close to the ground, and is at once distinguished from the better-known *S. serpens* by its tail-like or whip-like stem, and by its fewer but more divided branches. The fruiting spikes are abundantly produced, square, and ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 46. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. perelegans—per-e′-leg-ans (very elegant). A variety of *S. inæqualifolia.*

S. Pervillei—Per-vil′-lĕ-i (Perville's). Another name for *S. Vogelii.*

S. pilifera—pil-if′-er-a (hair-bearing), *A. Braun.*

A greenhouse species, belonging to the *rosulatæ* section, and rare in cultivation. It is a native of the plateau of Central Mexico, where it is found at 6000ft. to 8000ft. elevation. The stems are densely tufted, 3in. to 4in. long, and copiously divided, the branching of all grades being midway between pinnate and fan-shaped. This species appears to be intermediate between the two popular species, *S. involvens* and *S. lepidophylla.*—*Baker*, *Handbook of the Fern-Allies*, p. 88. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. platyphylla—plat-yph-yl′-la (flat-leaved). A synonym of *S. grandis.*

S. plumosa—plu-mo′-sa (feathery), *Baker.*

This stove species, of medium dimensions, has a wide range of habitat, being found on the Eastern Himalayas and the mountains of the Indian Peninsula and Ceylon, also in Burmah, Malaysia, South China, &c. Its pale-coloured, trailing stems, 6in. to 12in. long, often forked low down, are profusely branched, and their branches are copiously divided again, with

root-fibres extending to the upper nodes. The leaves of the lower plane are oblong or broadly spear-shaped, sharp-pointed, of a bright green colour, moderately firm in texture, heart-shaped on the upper side, and conspicuously overlap the stem ; those of the upper plane are half as long, egg-shaped, and much overlap. The fruiting spikes, abundantly produced, are square and ¼in. to ½in. long. *S. flagelliformis* is a garden name for this species.—*Baker*, *Handbook of the Fern-Allies*, p. 50. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. p. flagellifera—flag-el-lif′-er-a (whip-bearing), *Bull.*

A variety, native of the Fiji Islands, distinguished from the type by its branchlets terminating in a whip-like process.—*Baker*, *Handbook of the Fern-Allies*, p. 50.

S. Pœppigiana—Pœp-pig-ĭ-a′-na (Pœppig's), *Spring.*

A greenhouse species, native of the Andes, from New Granada to Peru. Its trailing stems are 1ft. to 2ft. long, forked at the base, jointed at the nodes, flat on the back, furrowed on the face, and copiously branched. The leaves of the lower plane are oblong-spear-shaped, bright green, of a moderately firm texture, much spaced, and scarcely overlap the stem ; those of the upper plane are oblique-oblong, with a distinct, sharp point. The fruiting spikes are square and ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 62. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. Poulteri—Poul′-ter-i (Poulter's), *Veitch.*

This remarkably pretty, greenhouse species is a native of the Azores. In habit it closely resembles *S. delicatissima*, but it is of a much more robust constitution, and its foliage, of a peculiar dark green colour, is of a much thicker texture. The very slender stems are three or four times forked, and the leaves of the lower plane slightly overlap them. The slender fruiting spikes are ¾in. to 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 84. *Nicholson*, *Dictionary of Gardening*, iii., p. 411.

S. pubescens—pu-bes′-cens (downy). A synonym of *S. Braunii.*

S. rigida—rig′-id-a (rigid). A garden name for *S. affinis.*

S. rubella—rub-el′-la (reddish), *Moore.*

A greenhouse species, distinct in habit and general appearance, introduced into cultivation (from what country is unknown) about 1870. Its somewhat upright stems, about 1ft. long, are of a reddish-brown colour and branched, the lower branches being again divided into five to seven branchlets. The leaves of the lower plane are oblique-oblong, moderately firm in texture, and of a dark green colour, turning reddish with age ; those of the upper plane are half as long and much overlap. The fruiting spikes are square and ½in. to 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 81. *Nicholson*, *Dictionary of Gardening*, iii., p. 412.

S. rubricaulis—rub-ric-au′-lis (red-stemmed). This is synonymous with *S. molliceps.*

S. serpens—ser′-pens (winding), *Spring.*

This remarkably pretty, stove species is very useful for covering bare surfaces of rocks or brickwork, upon which it thrives without soil. It is a native of the West Indies, and is also known in commerce as *S. mutabilis* and *S. variabilis:* these garden names are indicative of the changes which take place in the colour of the leaves at different times of the day. The stems, densely matted, quite trailing, and 6in. to 9in. long, are copiously branched. The leaves of the lower plane are crowded, blunt, and moderately firm in texture ; those of the upper plane are one-third as long and sharp-pointed. The square fruiting spikes are ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 46. *Nicholson*, *Dictionary of Gardening*, iii., p. 412.

S. setosa—se-to′-sa (bristly). A variety of *S. erythropus.*

S. sinensis—sin-en′-sis (Chinese). A garden name for *S. canaliculata.*

S. spinulosa—spi-nul-o′-sa (having small spines), *Spring.*

A stove species, of very small dimensions, native of Java, with very slender and little-branched, trailing stems 1in. to 2in. long. The fruiting spikes are very short and square.—*Baker*, *Handbook of the Fern-Allies*, p. 65. *Nicholson*, *Dictionary of Gardening*, iii., p. 412.

S. stolonifera—stol-o-nif′-er-a (stolon-bearing). A variety of *S. Martensii.*

S. suberosa—sub-e-ro′-sa (somewhat gnawed), *Spring.*

A greenhouse species, native of the Khasya Mountains, Sikkim, Assam, &c., with densely-tufted, somewhat upright stems, often above 1ft. long, pale shining brown, branched, and having root-fibres extending sometimes half-way up them. The leaves of the lower plane are oblique-spear-shaped, sharp-pointed, very distant and spreading on the main stem, bright green, unequal-sided, broadly rounded, and shortly ciliated ; those of the upper plane are half as long, oblong in shape, with a distinct, sharp point. The fruiting spikes, copiously produced, are ¼in. to ¾in. long and resupinate (so turned and twisted that the parts that are naturally undermost become uppermost).—*Baker*, *Handbook of the Fern-Allies*, p. 119. *Nicholson*, *Dictionary of Gardening*, iii., p. 412.

S. sulcata—sul-ca′-ta (furrowed), *Spring.*

This small, greenhouse species is said to be very common in Southern Brazil. The stems, trailing in the lower half, are usually upright in their upper half, flat on the back, deeply twice-furrowed down the face, and jointed at the nodes. The fruiting spikes are square and ¼in. to ½in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 63. *Nicholson*, *Dictionary of Gardening*, iii., p. 412.

S. tassellata—tas-sel-la′-ta (tasselled), *Bull.*

A stove species, as beautiful as it is thoroughly distinct from all others in cultivation (see Plate, for which we are indebted to Mr. Wm. Bull). Its erect stems, of a fleshy nature, are pinnately branched from their base to their extremity, and the branches and their branchlets are flat. The leaves, with which the branches are densely furnished, are sharp-pointed, of a pale green colour, stiff in texture, and overlap the stem. The fruiting spikes, abundantly produced, conspicuously pendent, and unusually long, are quadrangular, and greatly add to the beauty of the plant, to which they impart a tasselled appearance. This species is a native of Brazil.—*Nicholson*, *Dictionary of Gardening*, iv., p. 602.

S. texta—tex′-ta (woven). A variety of *S. involvens.*

S. umbrosa—um-bro′-sa (shade-loving). This is a garden synonym of *S. erythropus.*

S. uncinata—un-ci-na′-ta (hooked), *Spring.*

This is the proper name for the well-known and much-appreciated greenhouse species usually found in gardens under the name of *S. cæsia.* Its weak, slender, straw-coloured stems trail to a length of 1ft. to 2ft., when they usually terminate in a long, whip-like process ; they are furnished on each side with short branches, which are much divided. The fruiting spikes are square and ¼in. to ½in. long. This elegant species is much grown on account of its beautiful metallic-blue colour.—*Baker, Handbook of the Fern-Allies*, p. 48.

S. variabilis—var-ĭ-a′-bil-is (variable). Synonymous with *S. serpens.*



Fig. 112. Portion of Stem of Selaginella Victoriæ
(¼ nat. size).

S. Victoriæ—Vic-to′-rĭ-æ (Victoria's), *Moore.*

This lovely, stove species, of slender, graceful habit, native of Borneo, Fiji, and San Cristoval, may be best described as a plant intermediate between *S. Wallichii* and *S. canaliculata.* Its stems, 3ft. to 4ft. long, are furnished on

each side with leaflets 6in. to 9in. long, the upper branchlets of which are simple, while the lower ones are occasionally forked or slightly pinnate. The leaves of the lower plane, which are crowded, are sickle-shaped, sharp-pointed, of a dark bright green colour, and firm in texture; those of the upper plane, one-fourth as long, are shortly sharp-pointed and much overlapping. The fruiting spikes are square and 1in. to 2in. long (Fig. 112, for which we are indebted to Mr. Wm. Bull).—*Baker*, *Handbook of the Fern-Allies*, p. 90.

S. viridangula—vir-id-ang′-ul-a (green-angled), *Spring.*

A very distinct, strong-growing, stove species, native of the mountain forests of Fiji. Its somewhat upright stems, 3ft. to 4ft. long, are furnished with broadly-triangular branches sometimes 1ft. in length; these have their branchlets again divided into ultimate segments ½in. to 1in. long and bright green at the base. The leaves of the lower plane are sickle-shaped, sharp-pointed, of a bright green colour, and moderately firm in texture, and do not overlap the stem; those of the upper plane are very small, oblong, and terminate in a distinct, sharp point. The fruiting spikes are square and 1in. to 2in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 92.

S. viticulosa—vi-tic-ul-o′-sa (tendrilled), *Klotzsch.*

A very pretty, stove species, of small dimensions, native of Central America and Venezuela. Its stems are about 6in. long, simple in their lower part, broadly triangular and divided upwards, their broadly-triangular branches being twice or three times divided. The leaves of the lower plane are spear-shaped, sharp-pointed, of a bright, pleasing green colour, soft in texture, and much overlap the stem on the upper side at the base; those of the upper plane, one-third as long, are egg-shaped and sharp-pointed. The fruiting spikes are short and square.—*Baker*, *Handbook of the Fern-Allies*, p. 102.

S. Vogelii—Vo-gel′-ĭ-i (Vogel's), *Spring.*

This distinct, stove species, frequently found in gardens under the names of *S. africana* and *S. Pervillei*, is a native of the Guinea Coast, Cameroon Mountains, Zanzibar, and Madagascar. The upright stems, 1ft. to 2ft. long, are simple in the lower half and often pink-tinted, and are broadly triangular and much divided in the upper half. The leaves of the lower plane are spear-shaped, sharp-pointed, spaced, even on the branchlets, and do not overlap

the stems ; those of the upper plane are minute, egg-shaped, and sharp-pointed. The fruiting spikes are square and ¼in. to ½in. long. *S. V. dichrous* is a form with foliage bright red beneath.—*Baker*, *Handbook of the Fern-Allies*, p. 100.

S. Wallichii—Wal-lich′-ĭ-i (Wallich's), *Spring*.

A most distinct, stove species, native of the Eastern Himalayas, Malaysia, and New Guinea. Its beautifully-branched stems, of upright habit and 2ft. to 3ft. long, have pinnate branches invariably simple and 6in. to 9in. long. The leaves of the lower plane are crowded, oblong-spear-shaped, pointed at the upper corner, and equal-sided, the upper ones growing gradually smaller ; those of the upper plane, one-fourth as long, are shortly sharp-pointed and much overlap. The colour of the whole plant, which makes a magnificent specimen, is shining dark green, and the point of each branchlet is adorned with a square fruiting spike about 1in. long. When well grown, *S. Wallichii* resembles a good specimen of *Gleichenia flabellata*.—*Baker*, *Handbook of the Fern-Allies*, p. 90. *Nicholson*, *Dictionary of Gardening*, iii., p. 412.

S. Willdenovii—Will-den-o′-vĭ-i (Willdenow's), *Baker*.

This is not the *S. Willdenovii* of gardens, the plant usually found in commerce under that name being *S. Braunii* of Baker. The species here described is that which in commerce is grown under the names of *S. cæsia arborea* and *S. lævigata*. It is an exceedingly robust-growing and equally beautiful, stove species, native of the Himalayas, Cochin China, and Malaysia. The strong stems climb to a length of 20ft. or more ; they are furnished with lateral branches 1ft. to 2ft. long and divided into short branchlets. The beauty of this species resides in the magnificent peacock-blue colour of its foliage : this is intensified when the plant is grown in a moist, shady place, for it then assumes a bright metallic colour, sometimes reflecting a most lovely blue. The fruiting spikes are square and ½in. to 1in. long.—*Baker*, *Handbook of the Fern-Allies*, p. 93. *Nicholson*, *Dictionary of Gardening*, iii., p. 412.

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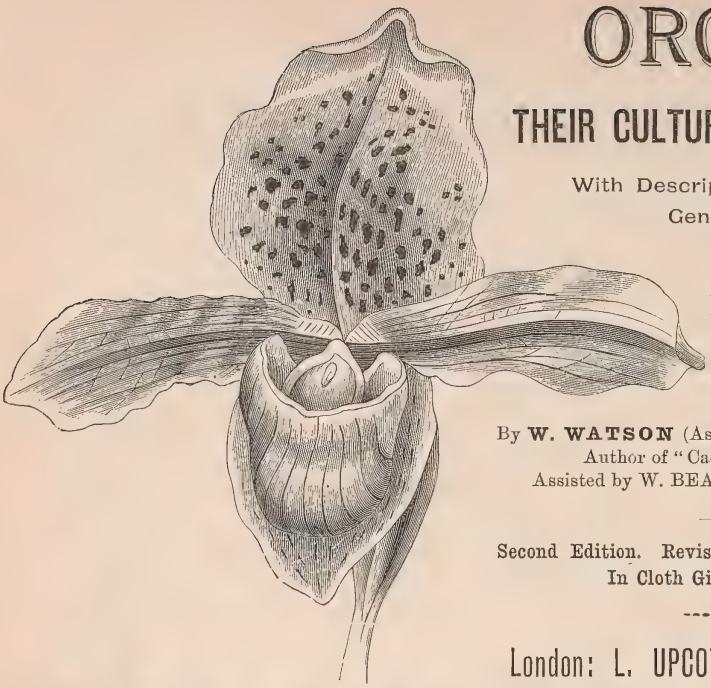
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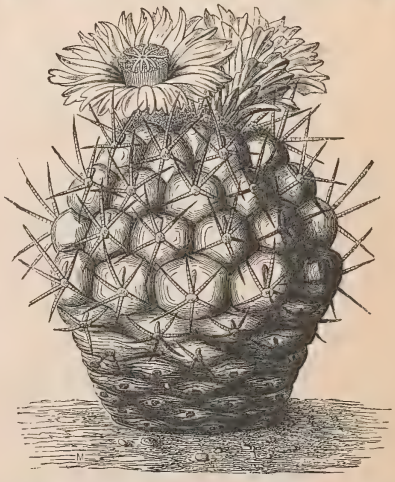
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